This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

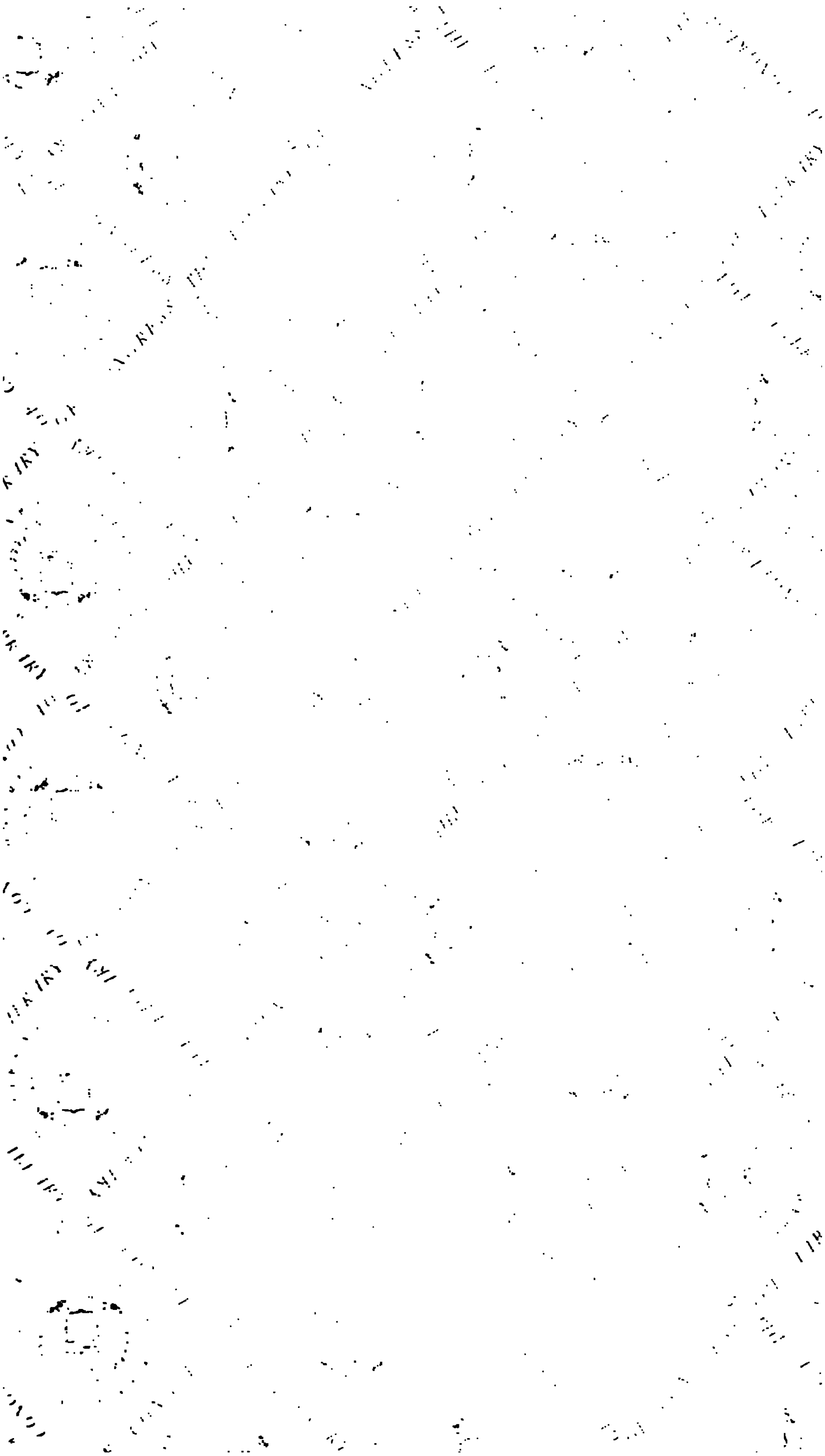
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

THE LIBRARY OF CONGRESS



THE

# QUARTERLY

# JOURNAL OF AGRICULTUR

VOL. VI.

JUNE 1835—MARCH 1836.

WILLIAM BLACKWOOD & SONS, EDINBURGH; AN
T. CADELL, STRAND, LONDON.
MDCCCXXXVI.

S3
.J8

PRINTED BY NEILL & CO. OLD FISHMARKET.

# CONTENTS.

I. Comparison of the Poor-Laws of England and Scotland, Page 1

II. Remarks on the Report of the Highland Society on General Shows of Live Stock, . . . . . . . 24

III. On an Improved Method of mounting the Cradle-Scythe, . 30

IV. Account of an Apparatus for Steaming Food for Horses, . 33

V. Observations on the Uses and Management of Heath. By Mr William Hogg, . . . . . . . . 42

VI. On Greenhouse Plants. No. II. By Mr Towers, Author of the Domestic Gardener's Manual, . . . . . . . 48

VII. Observations and Experiments proving the Parr or Brandling to be the Young of a Variety of the Salmon. By Mr John S. Milton, Surgeon, Bishopwearmouth. Communicated by Dr Knox, . . 62

VIII. On the Culture of the Dahlia. By James Heriot, Esq. of Ramornie, . . . . . . . . . 72

IX. On the Statistics of Sweden. By Mr George Stephens, Land-Drainer, Edinburgh, . . . . . . . . 92

X. On the usual Mode of Preparing Manure on Farms, . . 104

XI. On the Management of Belts of Planting, . . . 113

XII. On Rot in Sheep, . . . . . . . 117

XIII. Canada and the Illinois, . . . . . . 127

A Tour through North America; together with a Comprehensive View of the Canadas and United States, as adapted for Agricultural Emigrants. By Patrick Shirreff, Farmer, Mungoswells, East Lothian. Edinburgh, Oliver and Boyd. 1835.

XIV. Excretion of Plants, . . . . . . . 133

XV. On the Connexion of the Physical Sciences, . . . 138

On the Connexion of the Physical Sciences. By Mary Somerville. Second Edition. London: John Murray, Albemarle Street, 1835.

XVI. Miscellaneous Notices, . . . . . P
- 1. The Rohan Potato, a new variety, . . .
- 2. Kyan's Infallible Cure for the Dry-rot, . .
- 3. Sunshine and Shade, . . . . . .
- 4. The Water of the Nile, . . . . .

XVII. Quarterly Agricultural Report—Malt Tax, . .

XVIII. Foreign Corn Markets, . . . . . .

XIX. Tabular View of the Prices of the different Qualities of Wheat in the Edinburgh Market during 1834, . . .

XX. Tables of the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn; of the Revenue, &c. 1

XXI. Fiar Prices of the different Counties of Scotland for Crop and Year 1834, . . . . . . . . . .

XXII. Observations on the Agriculture and General Circumstances of the County of Wicklow, . . . . . . . .

XXIII. On the Advantages of Small Farms. By Mr William Blacker, Armagh, . . . . . . . . .

XXIV. On the British Plant-Lice, particularly those which are destructive to Field and Garden Crops. By James Rennie, A. M., Professor of Zoology in the King's College, London, . . . .

XXV. On Rot in Sheep, . . . . . . . .

XXVI. Remarks upon Theories on the Failure of Potatoes. By Mr Towers, Author of the Domestic Gardener's Manual, . .

XXVII. On the Amelioration of India, . . . . .

The Means of Ameliorating India, deduced from Personal Observations; more especially the Useful Employment of British Subjects and Capital in that Country. By Archibald Graham, Surgeon, H. E. I. C. Bombay Establishment.—Glasgow: John Reid & Co. Edinburgh: Oliver & Boyd. Dublin: John Robertson & Co. London: Whittaker & Co. 12mo. 1835.

XXVIII. On Draining and Embanking, . . . .

Systematic Treatise on Draining Land according to the most approved methods; and on Sea, River, and Lake Embankments, &c. By John Johnstone, Land-surveyor, Edinburgh. 3d edit., revised and enlarged. 1 vol. 4to, 25 plates. W. Blackwood & Sons, Edinburgh; T. Cadell, London; W. Curry & Co. Dublin, 1834.

XXIX. On the Application of the Points by which Live-Stock [illegible] judged,—I. To Short Horns. By Mr James Dickson, Cattle-Dealer, Edinburgh, . . . . . . . . .

XXX. Miscellaneous Notices, . . . . . Page 30
1. The Mode by which London is supplied with Strawberries, 30
2. The Coal Trade of Newcastle and Sunderland, . 30
3. City of Dort in Holland preserved by Milkmaids, . 30
4. Manner of making Persons free at Alnwick, in Northumberland, . . . . . . . . ib
5. Substitute for Indigo, . . . . . . 30
6. Yucca gloriosa, or Splendid Adam's Needle, . . 30
7. Philosophical Facts, . . . . . . ib
8. Geological Changes in Great Britain, . . . 31
9. Scarlet Trefoil, . . . . . . . 31
10. Pin-making, . . . . . . . 31
11. Consumption of Staple Articles in England, . . ib
XXXI. Quarterly Agricultural Report, . . . . 31
XXXII. Foreign Corn Markets, . . . . . . 31
XXXIII. Tables of the Revenue: the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn, &c. 316–31
XXXIV. On Reclaiming Waste Land. By Mr William Aiton, Hamilton, . . . . . . . . . . 31
XXXV. Thoughts on the Extension of Draining, . . . 32
XXXVI. On the Propagation of Rot in Sheep. By Mr Edward King, Steam-Carriage Station, Hammersmith, London, . . 33
XXXVII. On the Cause of Rot in Sheep. By Mr William Hogg, Shepherd, . . . . . . . . . . 34
XXXVIII. On Greenhouse Plants. No. III. By Mr Towers, Author of the Domestic Gardener's Manual, . . . . 34
XXXIX. On the Degeneracy of the Potato. By Mr William Paton, Greenaby, Bred, Isle of Man, . . . . . 35
XL. On the Excretion from the Roots of Plants. By Mr Towers, 36
XLI. Fiar Prices of Grain in Forfarshire, from Crop 1779 to Crop 1834, both inclusive, . . . . . . . . . 36
XLII. On the Species and Varieties of Domestic Fowls, . . 37
XLIII. On the Agriculture and General Condition of the County of Limerick, . . . . . . . . . . 39
XLIV. On the Application of Steam to the Purposes of Husbandry. No. III. . . . . . . . . . . 411
XLV. Some Account of the Fairs in Scotland. No. III. East-Lothian or Haddingtonshire, . . . . . . . 427
XLVI. On the Application of the Points by which Live-Stock are judged—
II. To the Shetland Breed, . . . . . 433
III. To the Orkney and Caithness Breeds, . . . 434
IV. To the North Highland Breed, . . . . 435

V. To the Aberdeenshire Breeds, . . . Page 438

VI. To the Angus Breed, . . . . . . 443

By Mr James Dickson, Cattle-Dealer, Edinburgh.

XLVII. Retrospect of the Corn Trade, British and Foreign, during the year 1835. By Mr William Gray Fearnside, Mark Lane, London, . . . . . . . . . . . . . 446

XLVIII. Account of the Show of the Highland and Agricultural Society at Ayr, . . . . . . . . . . 471

XLIX. Miscellaneous Notices, . . . . . 482

1. On Moss Improvements. By Mr A. Blackadder, Land-valuator and Surveyor, Allan Park, Stirling, . 482
2. A Cultivated Moor, . . . . . . 485
3. On the Failure of the Potato Crop. By a Farmer, . 486
4. Foreign Corn and Flour Trade, . . . . 489
5. Upton's Rotatory Lever Engine and Boiler, . . 491

L. Quarterly Agricultural Report, . . . . . . 492

LI. Tables of the Revenue; the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn, &c. . 494–496

LII. On the Varieties of Climate and Productions in the Russian Empire, . . . . . . . . . . 497

LIII. On the Danger of Over-draining Moss, . . . . 512

LIV. Thoughts on Draining as the speediest means of Fertilizing the Soil, . . . . . . . . . . . 515

LV. Horticulture—Asparagus, Sea-kale, Rhubarb, Artichoke. By Mr J. Towers, Author of the Domestic Gardener's Manual, &c. C. M. H. S., . . . . . . . . . . 533

LVI. Retrospect of the Corn Trade in America during 1835. By Mr W. Gray Fearnside, Mark Lane, London, . . . . 543

LVII. On the Application of the Points by which Cattle are judged, —VII. To various Breeds, &c. By Mr James Dickson, Cattle-dealer, Edinburgh, . . . . . . . . . . . 54

LVIII. Biographical Memoir of the late Right Honourable Sir John Sinclair, Bart. Founder and First President of the Board of Agriculture, &c. &c. &c., . . . . . . . . 5

LIX. On the Corn Trade of France and Hamburg. By Mr Fearnside, . . . . . . . . . . . .

LX. Miscellaneous Notice, . . . . . .

1. James Hogg, the Ettrick Shepherd, . . . .

LXI. Quarterly Agricultural Report, . . . .

LXII. Tables of the Revenue; of the Prices of the different qualities of Wheat in the Edinburgh market during 1835; the Prices o Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn, &c. . . . . . . . . .

THE

QUARTERLY

JOURNAL OF AGRICULTURE.

## COMPARISON OF THE POOR-LAWS OF ENGLAND AND SCOTLAND.

The inhabitants of the northern and southern parts of the island of Great Britain have, during more than two centuries, been the subjects of the same king. With the exception of Wales and the Scottish Highlands, they have spoken the same language, and they have professed the same Protestant Christian faith. They both about the same period, under the influence of the principles of Christianity, created by law a compulsory assessment for the relief of their poor. The results of their legislation have been different, in a degree that must afford much subject of speculation to the philosopher, and of instruction to the statesman and the moralist.

It would prove unsuitable to this publication, to enter into a detail of the various enactments framed in England and Scotland for the purpose of levying and administering a fund for the support of the poor. It may prove more useful to advert concisely to the prominent features of each of the systems, together with the effects which they have produced. Indeed, were we to give here a detail of enactments, we should have little to say comparatively with regard to Scotland. It is now nearly 140 years since any statute was passed amending or altering the poor-laws of Scotland; whereas in England, since the time of Elizabeth, no reign has elapsed without a succession of enactments recorded in the statute-book, attempting to obviate difficulties, remove-grievances, and improve the administration of the law for the relief of the poor. So recently as the last session of Parliament, an extraordinary effort of legislation was made upon this subject, which we shall briefly notice at the close of our remarks.

From 12 Richard II. (1388), various acts of Parliament were passed in England relative to the poor, but chiefly for the purpose of restraining vagrants, and of confining the begging poor to the parishes or districts of their birth, or in which they had last resided during three years. At length came the statute 43 of Elizabeth, c. 2, which has formed the basis of the English system of poor-laws. Under that statute, and those which followed it, the funds to be levied were to be applied to two purposes; *first*, to support the impotent poor; and, *secondly*, to set to work children and others capable of labour, but following no daily trade. This last regulation led to the establishment in England of the fundamental principle, that the community must find subsistence for all its members. If an able-bodied labourer is without employment, the public must provide for him food and raiment. It may set him to work, but whether this be done or not, he is entitled to be supported. In other words, it was in effect enacted, that there should be no such thing in Englan as want or distress arising from poverty.

Every parish was formed into a separate community, bou to support its own poor. In proportion as the expense of porting the poor became burdensome, parishes were rend jealous of the introduction into them of persons who might mately be likely to claim a provision for themselves, or children as paupers. Hence, at different periods, a variet enactments were made, fixing what was styled the law of ment in a parish, and parishes opposed the introduction their people of strangers, not expressly authorized by settle among them. As this impeded the free circulatio bour, they were at length prohibited by 35 Geo. III. from removing strangers till they became actually ch In general, the professional writers on English law, comp their statutes relative to the poor, considered as a sy extremely obscure. It is chiefly, therefore, of import tend to the interpretation put upon them in practice. The general rule as to acquiring a settlement in a parish, as fixed by 13 and 14 Car. II. c. 12, was, that, on application of the parish-officers, any Justice of Peace might grant warrant for removing, within forty days after his arrival, any stranger settling in a tenement worth less than L. 10 per annum. If no such application was made in forty days, the settlement was acquired, or at least it was acquired in three years. Then came future statutes, introducing a multitude of exceptions. 1*st*, The stranger was to give notice in writing of his arrival. 2*d*, He was to bring a certificate from the parish-officers of his last residence, acknowledging his settlement there. 3*d*, Hiring gave no settlement, unless for a full year. 4*th*, The purchase of an estate worth less than L. 30, conferred no settlement. 5*th*, Nor payment of taxes on a tenement worth less than L. 10 per annum. 6*th*, A series of statutes explaining the law on the subject were passed.* It may be added that birth, in the case of legitimate children, and marriage and apprenticeship conferred a right of settlement.

In the case of bastards, the mother and putative father were required to support the child; and by 6 Geo. II. c. 31, and 49 Geo. III. c. 68, if a single woman declared herself pregnant by a man, any Justice of the Peace, on the application of the parish-officers, was authorized to send him to goal, unless he should find sureties willing to become bound that he would appear at the next Quarter-Sessions, and pay what should be then awarded.

By various statutes parishes were authorized to build workhouses for the poor. By 9 Geo. I. c. 7, relief was prohibited to be granted to persons who should refuse to enter the workhouse; but this was repealed by 36 Geo. III. c. 23.

In one word, the law of England relative to the poor may be summed up in the remarks already made, that every person, old and young, is entitled to be supported by his parish, unless it can be shewn that he has wherewithal to support himself. But parents having ability are bound to support their children.

---

* See 1 James II. c. 17; 3 W. & M. c. 11; 8 and 9 W. III. c. 30; 9 Geo. I. c. 7; 35 Geo. III. c. 101; 59 Geo. III. c. 50; 6 Geo. IV. c. 57; 1 W. IV. c. 18.

The next point to be considered, is the machinery created by the law of England for the administration of the poor-laws, or the persons entrusted with that duty. These are or were overseers, vestries, and magistrates.

I. The overseers were appointed by any two Justices of the Peace; and these officers, for about a century, from the time of Elizabeth had the sole power of imposing *rates*, and administering relief to the poor. They gradually became subordinate to the vestries and magistrates.

II. The vestries are of three kinds,—open, representative, and vestries the members of which elect their own successors in office. The *open* vestries consist exclusively of those who pay poor-rates. These are the *possessors* or occupiers of lands or houses within the parish, *not* proprietors, unless they are occupiers. Thus generally the tenantry and householders are the rate-payers, and they pay in proportion to the rental of the property possessed by them. All the rate-payers have an equal vote when assembled in vestry. It has formed almost everywhere the ruling authority of the parish, the overseers attending merely as members of the vestry, voting with the others, but submitting to be controlled by the majority, although not very clearly bound to yield such submission.*

*Representative* vestries were established in virtue of 59 Geo III. c. 12, § 1, which authorizes the inhabitants of any parish i vestry assembled, that is, the whole of the rate-payers, to ele not more than twenty, nor less than five substantial householde who, with the minister, church-wardens, and overseers, are form the *select vestry* of the parish. This select vestry is dire ed to meet every fortnight or oftener, to determine the pro objects of relief, and the nature and amount of that re The overseers are to obey them. Of late years these vestries have considerably diminished in number, the rate-pa neither being compelled nor inclined to delegate their pow

*Vestries who elect their own successors*, are also styled vestries, and have long existed in many parishes by local held equivalent to legal title.

III. Magistrates, that is to say, Justices of the Pe the remaining class of functionaries empowered to the poor-laws. They* were at first authorized to select the objects of relief, and to tax the parishes. That duty was speedily devolved on the overseers appointed for each parish by two Justices. Power was afterwards granted to the Justices to oblige overseers and parishes to relieve the poor on complaint made. This was so far limited, that the 9 Geo. I. c. 7, forbids any Justice to order relief, till oath have been made by the pauper, that he has applied to the parishioners assembled in vestry, or to two overseers, and has been refused.

---

* See 9 Geo. I. c. 7, § 1.

The next subject for consideration is the working or practical effect of the English poor-laws. For a statement of the practical effect of these laws we have abundant materials in the Report of certain Commissioners, appointed by his Majesty "to make a diligent and full inquiry into the practical operation of the Laws for the relief of the Poor in England and Wales." That Report was laid before Parliament, and formed the basis of the act for the amendment of the poor-laws, 4 and 5 William IV. c. 76, passed in 1834: The source of our information is therefore apparently very authentic. The chief difficulty in generalizing their statements is, that the Commissioners usually refer to the evidence or reports of individuals, which are always in a less or greater degree local; but by transcribing specially such evidence, the Commissioners must have meant to represent it as containing matters of very general prevalence. As the new statute has not yet been fully acted on, the old practice may safely be referred to as in a great measure still in operation. From the multitude of functionaries employed in administering the English poor-laws, and the admitted obscurity of many of the enactments, much variety of practice has necessarily occurred.

The first class of paupers are the able-bodied, who obtain relief, styled either in-door or out-door, according as it is given to them in the workhouse or out of it.

1. One kind of out-door relief has consisted of partially or totally relieving applicants from the expense of obtaining house-room, clothes, &c. Generally the habitations of labourers are exempted from the poor-rates, where the occupant is a parishioner;

---

* 39 Eliz. c. 3; 39 Eliz. c. 2; 3 and 4 W. & M. c. 11 and 8; and 9 W. & M. c. 30.

and, it will always be recollected, that the landlord pays nothin as such. In other cases the rent of the labourer is paid. Th consequence is, that building speculations of whole streets an rows for the poor have been entered into. Paupers are a d sirable class of tenants, and preferred by cottage proprieto to the independent labourers, whose rates they enhance. Th practice is most prevalent in towns and villages in which trade men have an influence in the disposal of the poor's fund There is no kind of property which yields a higher or bett paid rent than the houses of the lower classes. The landlo has only to adopt rigorous measures to enforce his demand, an then the parish pays to avoid throwing a family on the pari from want of their goods. A case is mentioned in Suffol (p. 17.)—A baker, with a family of eight children, had his re of L.13 a-year paid for him by the parish, besides an allowan of 2s. 6d. a-week for his children. The parish discontinued th payment of his rent, whereupon his goods were distrained, an he lost his business. The parish were upon this obliged to tal him and his family into the workhouse. It was found that cost the parish about 5s. per head per week, or about L.130 year to maintain them in this way; and it was judged most pr dent to hire a house for him, and buy furniture, for the pu pose of setting him up in his trade again, and also to give hi the former allowance in money. Thus, a pauper is the best all tenants, as the parish must pay his rent. Even when n paid in full, an application for a part is sure to be successful.

2. Without regard to house-room, out-door relief to abl bodied persons is also given in money, and first without req ing labour in return. The applicant pleads that he has unable to obtain full work, that he has lost a day or two, On such pretexts, young men demand from the unlimite sources of the parish an indemnity for their loss. Youn in this way often receive 2s. 6d. or 3s. per week, and, e ing their time in depredations of various sorts, do no work ever.

More generally, there prevails the *allowance* system which the parish allows to individuals in actual emplo regular sum in aid of wages, or an occasional sum to bu &c.; whereby the wages paid by private individuals down, or at a low rate. More frequently, the parish price of a certain quantity of bread to each member of a family. Tables of such allowances have been made up for districts by the Justices of Peace and the Overseers and Church-wardens, to be granted to all who apply for relief or employment.

Thus, in Cambridge, to a single woman, the price of 3½ quartern loaves per week is allowed; to a single man, 4½; to a man and his wife, 8; if they have one child, the price of 9½ quartern loaves; two children, 11 loaves; three children, 13 loaves; or if more children, the price of 4½ quartern loaves per head per week, besides additions in case of sickness, &c. The object of the allowance is to make up for deficiency of wages, and is regulated by the number of the family. In winter, generally, a labourer in the country comes on the parish, whatever he may have earned in summer. It is enough that he is now in want, having no work, or short work and short wages.

Many parishes oblige the occupiers of property to employ the applicants for relief at a rate of wages fixed by the parish, and depending, not on the services, but on the wants, of the applicant, the employer being repaid out of the poor-rate all that he advances in wages above a certain sum. (p. 31.) This is called the *roundsmen* system or *ticket system*, because the labourer takes a ticket to the farmer, as a warrant to employ him, and returns it signed by the farmer, as a proof of his service. Additional wages above the ordinary rate of labour are also allowed to every labourer, in proportion to the number of his children, beginning at three in number. The conduct or ability of the labourer as a workman is not regarded.

Parishes sometimes employ in actual labour, and pay wages to the applicants for relief who say they have not found employment. They are set to dig gardens or fields, or to work on the roads. Such labour has in all cases proved most unprofitable; little or nothing is done; the men have indulged themselves in utter laziness, and usually become so infamous that nobody would employ them. Whatever his previous character may have been, parish employment of an individual, though occasional, on the roads, ruins him as a labourer. (p. 47.) Every principle of industry is violated. When the single man gets 5s., the married man, for the same work, gets 10s.; whereby they are made to feel that the work and the wages have no true connexion.

It has been found in England that the tendency of out-door

relief is to proceed in a train of constant extension of ex
The sense of shame is soon obliterated by habit and exa
and in towns it is impossible to scrutinize accurately the
in which it is claimed. Take this case: A shoemaker h
relief as in want of work. Go to his house, and, if absent
are told he is out in quest of work. The truth of thi
scarcely be known in a town even with intense vigilance
he is at home and at work. He pretends he has just got
*for the day*. He adds he has not paid his rent or his char
shop score, an execution is threatened, and if his relief be
ped, he and all his family must *go home*, that is into the
house. This is a conclusive argument. Or, take this
(p. 45.) " In one day, on the parish book in Southwark,
Arundell, a sawyer, aged 55; his son William, aged 22, a
drawer; Ann Harris, 58; her husband is in Greenwich I
tal. Her son John and his wife also came separately; s
their son, a smith, aged 18." Thus, we have pauper f
pauper wife, pauper son, and pauper grandchildren, in one
One member of a family and one neighbour brings an
Attempts to treat the deserving better than others, have a
done harm. It excites murmuring, and ultimately to satis
clamours of the undeserving, the scale of relief is raised.

3. As to in-door relief, by subsistence in a poorhouse
by courtesy a workhouse, the paupers in England usual
mark that they live better there than they ever did before.
have excellent apartments, good beds, and abundance of th
est food. They live no doubt in the society of many bad c
fligate persons, but to this they become accustomed; and ch
brought up in the workhouse are extremely apt, when place
been got for them, to desert their service, and return to the
house. In general, the workhouse is a large almshouse, in
the young grow up in idleness, ignorance and vice, (p. 58
able-bodied are maintained in sluggish sensual indolence
aged and more respectable exposed to worthless society, a
whole body of the inmates subsist on food, far exceeding
in kind and amount, not merely the diet of the independ
bourer, but that of the majority of the rate-payers.

It will not appear surprising that this system of poor
popular with the inferior orders of society. " The la
feels that it gives him perhaps low wages, but always

and independence." (p. 57.) He need not bestir himself to seek work; he need not study to please his master; he need not put any restraint upon his temper; he need not ask relief as a favour. He has all a slave's security for subsistence, without his liability to punishment. As a single man, indeed, his income does not exceed a bare subsistence, but he has only to marry, and it increases. Even then it is unequal, out of the workhouse, to support a family, but it rises on the birth of every child. A man with a wife and six children, entitled, according to the scale, to sixteen shillings a-week, in a parish where private individuals pay only ten shillings, is almost an irresponsible being above hope or fear. If he abscond and desert his children, he knows they will be well taken care of. "It appears to the pauper that the government has undertaken to repeal in his favour the ordinary laws of nature; to enact that the children shall not suffer by the misconduct of their parents, the wife for that of the husband, nor the husband for that of the wife; that no one shall lose the means of comfortable subsistence, whatever be his indolence, prodigality, or vice; in short, that the penalty which, after all, must be paid by some one for idleness and improvidence, is to fall not on the guilty person or his family, but on the rate-payers encumbered with his settlement."

In consequence of this perpetually increasing evil, the English nation, for the year ending 25th March 1832, paid in poor-rates the sum of L.7,036,968, although in that year the price of corn was extremely low. It deserves next to be considered what effect this enormous expenditure on such an object (which no other European people of equal numbers could have supported, without ruin), produced on the parties more directly connected with it. Of its effects on labourers we have already taken some, though not adequate notice.

By the effect of this constantly increasing burden, it appears that in one parish, that of Cholesbury in Bucks (p. 64), the collection of the poor-rates in 1832 suddenly ceased, in consequence of their enormous amount. The landlords gave up their rents, the farmers their tenancies, and the clergyman his glebe and his tithes. It was found that even by dividing the whole land of the parish among the able-bodied paupers, these able-bodied paupers would be unable to get their bread out of it without aid, during two years, from the neighbouring parishes;

, after all, the aged and impotent must remain a perma
rden on these neighbouring parishes. In other quarter
ecame untenanted, or the rent reduced to a half or less, o
t of the poor-rates. The Commissioners mention a farm i
f 420 acres of good land, tithe free and well situated, whic
st been thrown up by the tenant on account of the poor-rat
Aylesbury they mention forty-two farms untenanted. A
nborough, Bucks, 600 acres unoccupied, and the greate
of the other tenants had given notice that they were to qui
farms. Many other places are mentioned as in a similar stat
the same cause. (p. 65.) Generally, after 1820, this disas
s result was proceeding gradually over England, in conse
nce of the increasing burden on the possessors of land. I
ny quarters a total absorption of the land, in twelve or four
n years, was anticipated by men of character and intelligence
amined by the royal commission. The soil of England ha
late been hastening fast to become the inheritance of the poor
ithout enriching them, because the same poor-rates keep them
own which had brought down the former proprietors. Divid
he land of a parish among the poor, and they are speedily op
ressed by the necessity of supporting the progeny of improv
lent marriages, whom the poor laws oblige them to maintain
ffluence.

This downward progress was ruinous to the habits of
abourers. Their industry ceased from their growing indi
ence, or even partiality, to being thrown on the parish.
entleman stated (p. 70), that, " at Rochford, Essex, the
ish) overseers make up wages to 1s. 9d. per head to fam
y the magistrates' order, and this they demand as their
Good ploughmen are not to be found. The labourers say
do not care to plough, because that is a kind of work, wh
neglected, will subject them to punishment, and, if properly
equires constant attention, and the lads do not wish to
Nine able-bodied young men were in the workhouse la
er; such was their character, that they were not to be
with thrashing." " When the bad season is coming
(the labourers) frequently dispose of any little property
such as a cow or a pig, so as to entitle them to pari
The workman tells his employer he does not want hi
wages, he can do better on the parish. In gener

marked (p. 69), that such a resource in view as parish wages prevents the labourer's exertions, and the young men from laying up any thing in youth. They marry early from this prospect. An instance is mentioned of "a labourer marrying, and going from the church to the poor-house, not having money to pay the fees." By an old experienced labourer it was supposed, "one labourer, forty years ago, would do more than two of the present day."

One great evil has been, that those labourers who retained their independence could get no employment, because the farmers were constrained to employ the bad workmen, who were ready to throw themselves on the parish, and thus increase the rates. Take the case of William Williams, a hard-working industrious married man, who had acquired two cows, and a sow and ten pigs, and saved L. 70; he also got a legacy of L. 46. "The consequence of this labouring man having been frugal, and saved money, and got the cows, was, that no one would employ him, although his superior character as a workman was well known in the parish. He told me (says an employer) at the time I was obliged to part with him, 'Whilst I have these things I shall get no work; I must part with them all; I must be reduced to a state of beggary before any one will employ me;' he has got no work, and he has no chance of getting any, till he has become a pauper, for, until then, the paupers will be preferred to him."

Matters soon came to this, that mothers and children would not nurse each other in sickness till they were paid for it by the parish, which was accordingly done (p. 96).

But all these effects of the English poor laws seem slight compared to their effects on the morals of the female sex of low station.[*] By the effect of the statutes already mentioned, there was placed at the mercy of every abandoned woman, every man who is not rich enough to find sureties. They exposed him to be dragged, without any previous summons, before a Justice of the Peace, not empowered to inquire into the merits of his case, but bound to send him to jail if he do not find sureties to relieve the parish of the effects of the woman's alleged pregnancy. "At eter, an apprentice of eighteen years of age was recent mmitted to the house of correction for want of security. as admitted that there was no chance of his absconding; b e overseer said he had been brought for punishment. Tl oman stated that she was only three months gone with chil nd thus the boy is taken from his work, is confined five ix months among persons of all classes, and probably ruin for ever, on the oath of a person with whom he was not co fronted, and with whom he denied having had any intercourse (p. 167).

---

[*] 6th Geo. II. c. 31, and 49th Geo. III. c. 68.

In his testimony before the Lords' Committee, in 1731, M Simson said, (p. 176), "When a man has a bastard child swo to him, he is brought before a magistrate. The magistrates a placed in this predicament: They say to him, 'Will you marr this woman; will you support the child, or will you go to pr son?' The man very naturally says, 'I cannot support the child and 'I am exceedingly unwilling to go to Oxford jail, an therefore, of the three evils I will chuse the least, and marry th woman, although it is probable that the child is not mine.' You Lordships are aware, that when a bastard child is sworn to man, the magistrates will not go into the question, whether t woman has had any connection with any other man. The c sequence is, that a woman of dissolute character may pitch u any unfortunate young man whom she has inveigled into net, and swear the child to him, and the effect of the law, now stands, will be to oblige the man to marry her. The sequence is, that the parish, instead of keeping one bas child, has to keep half-a-dozen legitimate children, the res the marriage.' You say to a woman, as long as you con virtuous and modest you have no chance of getting a hus because, in the present state of things, the men are ca about marrying; but if you will be intimate with any you please, the law will oblige him to marry you."

"Several clergymen told me," said Mr Maclean (p "that four-fifths of the women are with child, and fr near their confinement at the time of their marriage, [illegible] this want of chastity may be attributed, in a great [illegible] the law of bastardy, which secures to the woman [illegible] band or a weekly allowance for the support of her [illegible]

Other clergymen stated (p. 173), that among the poor whom they married, nineteen out of every twenty were pregnant at the date of the ceremony. One witness said seventeen out of every twenty. Charles Sawyer, Esq. J. P. stated that the magistrates award a weekly sum to the mother, ' and it sometimes happens, that if a woman has two or more bastard children, she is considered a good object of marriage on account of these weekly payments, and thus marriages are contracted which are in the end productive of misery to the parties, and of injury to the community.' In Sunderland, a young woman of twenty-four years of age, with four bastard children, said, " *if she had one more she would be very comfortable*," (p. 174).

The effect of this state of things is, " that the female, in very many cases, becomes the corrupter, and boys much under the age of twenty, are continually converted by this process into husbands."

Parishes are represented as making singular efforts to relieve themselves of the effect of threatened pauperism, and to devolve it on some other parish, (p. 163.) Legitimate children form a burden on the parish of the father, whereas illegitimate children fall on the parish of the mother. Hence, " in cases where young women are likely to inflict a burden on parishes, being pregnant, the reputed father is tempted by the parish officers, by bribes as well as threatenings, to enter into marriage."

But quitting this most disgusting subject, it is next to be remarked, that the machinery by which the English Poor Laws were enforced, has had a tendency to augment the evils attending them. As to the *overseers* generally, their office is annual, or in some places it is made of shorter endurance, on account of the reluctance of creditable persons to hold it, because thereby withdrawn from their business, and exposed to odium on the part of the poor, if they are not treated with the liberality they claim. In towns and villages, the overseer being generally a shopkeeper, much of his business often depends on persons of low station; and in fact it has happened that a large proportion of the parish charity has been spent at the parish overseer's house or shop, he being a dealer in articles of clothing, and frequently in spirituous or other liquors. Such overseers are exposed to irresistible inducements to give undue favour to the poor. supposing their integrity to be proof against these, there i ther ground of influence. In Great Grimsby, the oversee (p. 103), that "most of the relief is altogether unnece but he is convinced that if an abatement were attempte life would not be safe; he looks to the farmers for s which they dare not give, considering that their lives an perty would be in danger."

"The tone assumed by the pauper towards those wh pense relief is generally very insolent, and often assumes more fearful character. At Great Gransden, the overseer told Mr Power, 'that two days before my visit ther paupers came to her husband demanding an increase of ance; he refused them, shewing at the same time that th the full allowance sanctioned by the magistrates' scale; swore and threatened he should repent of it; and such wa violence, that she called them back, and prevailed with h band to make them further allowance.'"

By 59 Geo. III. c. 12, parishes were authorized to a permanent assistant overseers receiving pay, but this pro little amelioration of the practice.

Then as to the *open vestries*, consisting of all the rate-p they have generally formed a scene of petty intrigue, jo angry contentions, and violent debate. As lands are ge held from year to year, the farmer prefers cheap parish l ers, and low rents, for which the poor-rates form a su claim, and are therefore preferred to any plan of good m ment of the poor. A prudent farmer will not speak c opinion, and a dexterous one tries to get the job of sell produce to the parish workhouse. The shopkeeper or man on the other hand, claims the praise of liberality poor because he derives more profit from their *custom* oss from his share of the rate.

The *representative vestries* speedily became a source of popular declaimers, with a view to their own interest, ined themselves to be chosen to an office attended with ouble, and which, therefore, the industrious and more re persons avoided. The Royal Commissioners say (p. 1 Wilson has furnished a list of the select vestry of M

1832. Out of the twenty persons composing it, one is a brewe two are brewers' clerks, five are publicans, two beer-shopkeeper and one a porter-seller; so that eleven, or a majority of the whol number, are interested in the sale of beer; and the mother one, the wife of another, and the uncle, aunt, and cousins of third, are paupers. We cannot wonder to find it stated, th the better class of vestrymen retired in disgust from the int rested clamour of their colleagues."

From these and other causes, the appointment of select ve tries seems to have been generally abandoned, especially in co sequence of the riotous proceedings in 1830–31, when person could not be found willing to incur the odium, or expose them selves to the vengeance openly threatened against those su posed active in the administration of the parochial funds.

The ordinary tribunal for deciding all claims to parish relie and the amount of that relief, has been the *Justices of the Peac* Under the liberality of these magistrates, the system grew u They personally had usually little or no knowledge of the chara ter or wants of the alleged paupers. The access to these m gistrates by the paupers was so easy, the trouble to parish of cers in contending against them so great, and the tendency gentlemen to lean to the popular and humane side so obvio and natural, that the alleged paupers were very generally su cessful in their appeals. There were exceptions; but the spir of the system gradually prevailed over the prudence and fir ness of individuals.—Such have been the poor-laws of En land. Truly there must be something radically most valuab and vigorous in the native character of Englishmen, which, u der such laws, has enabled them to retain that degree of wor and industry they still possess.

We next turn to the poor-laws of Scotland. The Scotti Legislature commenced, like that of England in relation to t poor, with enactments calculated for the restraint and punis ment of vagrants, and the suppression of sorners or sturdy be gars; against whom, in the fifteenth century, severe and eve sanguinary punishments were enacted. But before the legisl tive Union with England, a system of poor-laws was gradua ly established, and still continues. It consists chiefly of regul as framed by the Scottish Privy Council, which obtain thority to that effect.

The poor-laws of Scotland may, for our present purpose, briefly stated. They concur with those of England in t ablishment of a parochial system, and consequent law of s lement; but differ from that system in the objects of relief, t nachinery by which the law for the relief of the poor is carri into effect, and in various other circumstances.

1*st*, The old laws against vagabonds and idle and unemploy persons have long ceased to be enforced. They are regulatio of police; and although such persons, if subjected to restrai or punishment, would obtain subsistence while so under punis ment, yet they themselves have no legal claim as paupers f maintenance.

2*d*, The only persons legally entitled to parochial relief Scotland, are persons who, from extreme old age or permane bodily debility, are incapable of earning a subsistence, or orpha and destitute children, whether legitimate or illegitimate. W dows left destitute with a family are also held entitled to p rochial aid. Temporary incapacity also affords a claim; but person is entitled to permanent relief who is able to work so to gain a livelihood, and he must seek out work for hims Such, however, as are entitled to parish relief, must have a tlement within the parish resulting from three years' reside from birth, or from marriage to a man who has that privile

3*d*, The administration of the poor-laws is, in countr rishes, vested in a body or court, consisting of the he (owners of property), and the members of the kirk-session sisting of the minister and elders. The ordinary manage such as the making lists of the poor, and making paym them, is entrusted to the kirk-session; but the power of the rate of allowance, and the persons to receive it, is w the general body. When assembled, every member of t of heritors and kirk-session has a vote equal to every oth ber. In principle this might seem erroneous, because t session form a self-elected body, in the nomination of minister usually has supreme influence. But we are that any inconvenience has in practice resulted from cumstance. Matters are left to the minister and heri

The fund under the management of the body now mentioned, consists of weekly collections made at the church,—in some parishes of sums mortified or settled on the poor by testamentary bequests; and where these fail, of assessments imposed by a meeting of the heritors and kirk-session, convened by the minister, or, during a vacancy of the church, by any heritor. The assessments are payable as a general rule, one-half by the heritors (proprietors) who impose them, and the other half by the possessors (tenants) of lands, houses, &c. within the parish.

In many country parishes where manufacturing villages have not been established, the heritors assess themselves only, being aware that ultimately the whole must fall on property, and, as far as possible, they are unwilling to impose any burden on the farmers beyond their fixed rents.

If the parish heritors refuse to do their duty, their proceedings, granting or refusing relief, are liable to review, not by any inferior magistrate, but by the Court of Session, as having a sovereign power to enforce the law within Scotland. The Sheriffs of counties, however, who are all barristers, and regular judges holding office for life, decide disputes between parishes in questions of settlement.

In Royal Burghs, the duty of administering the poor-laws is imposed on the magistracy of the burgh. They have all the powers vested in the heritors and kirk-session in country parishes, but they usually take the assistance of their kirk-sessions.

The difference, in point of effect, between the law of Scotland and that of England has been very great. In both countries the relief of the poor is compulsory. In Scottish towns, from the difficulty of ascertaining the persons truly entitled to relief, and the tendency of the managers to act with injudicious humanity, the burden of the poor has of late become sufficiently heavy. In parishes near the border of England, a foolish vanity of emulating England in every thing, is also said to have led many parishes to augment the poor-rates by imprudent liberality. A similar accusation has in some instances fallen on particular clergymen, and produced dissension between them and the parish heritors. On the whole, however, we in Scotland are most truly entitled to look back with gratitude to the

m of our forefathers, who did the best for us in relation to
natter, and protected their posterity against the evils which
sagacity could not fail to foresee were impending on their
wealthy neighbours of England. It is unnecessary to en-
e on the subject. They who know Scotland, are aware that
have escaped in a great degree the physical and moral evils
ed by injudicious charity on England. Here the idleness
character of a labourer is a misfortune that falls on him-
f and his family, and not on the parish. Industry is en-
raged, and a character of temperance, prudence, and fore-
, produced. But it is not altogether from the special re-
ulations relative to the poor that Scotland has escaped from the
ppression and corruption of the poor-laws that have fallen on
England. There have been concurring circumstances that must
be taken into account.

In relation to these laws, there are no doubt the prominent
facts, that, in Scotland, the able-bodied are not entitled to parish
charity, and that poor-rates are not only payable by the proprie-
tors, but that they, assisted by the minister, impose the assess-
ments. The first of these rules has not prevented extraordinary
contributions from being made for labourers in times of famine,
or very unusual dearth from scarcity. Still, however, the ex-
clusion of able-bodied persons from any legal claim has neces-
sarily restricted the assessment. The second of the rules now
mentioned has also been found highly important. In countr
parishes, the meetings of heritors never formed tumultuary bo
dies, and, by the general rank of the members, every sort of jo
bing has been of course excluded. The rule that every mem
has an equal vote has been of great value. A nobleman or weal
commoner interfering at such meetings has always done ha
from ignorance of the way in which the labouring people liv
from ill-judged humanity, and a desire of the praise of libe
In general, however, such persons have been controlled
smaller proprietors. A blue bonnet laird has no idea of
the poor better than he feeds himself, and his wife and
Thus the poor-rates are kept down. The keeping th
has the effect that, in rural parishes, where individuals
to the neighbourhood, it is still held discreditable
without absolute necessity, for the small allowance gi

public. The relief is often tendered before it is sought, and is occasionally rejected till severe necessity compel the acceptance of it.

The same Legislature that enacted our poor-laws also established schools, affording cheap education in every parish. Hence it gradually became a source of reproach for a parent not to have his children taught at least to read and write the English language; and where the teacher was better qualified, a higher education was obtained. Parents found a good education the best provision for their children. A desire of emigration was produced from the country to towns or to foreign territories. Children at an extremely early age learned to regard literature as the means of getting rich, and a proud and adventurous spirit was nourished, which relieved the country of much of its surplus population, before Scotland became crowded, and the character of its people altered by an inundation from Ireland into the workshops, spinning-mills, and factories of all descriptions, which now abound in our land.

The mode of living in Scotland has also been lower than in England; and hence it is less expensive to provide for a poor man here than in the south. An English labourer thinks himself starved, if he do not daily eat butcher-meat and white bread, and drink malt liquor; whereas in Scotland milk and meal (oatmeal) make a plentiful house, and our ablest ploughmen take nothing more. Potatoes, which the children of our gentry prefer to bread, are regarded with considerable scorn by labourers in the south of England. What an English labourer spends on his bacon, beer, and white bread, is, in the hilly parts of Scotland, spent by the Scottish labourer on the education of his children. Nay, the most intelligent and popular of the English periodical writers, William Cobbett, M. P., seems to have no idea that better can be done for English labourers, than to feed them well with bacon, bread, and ale. He does not appear to think them capable of rising to intelligence, or of finding their highest enjoyment in the cultivation of their minds, as religious and moral beings, and in the ambition of educating their children to the possession of accomplishments not enjoyed by themselves.

The evil of bastardy, according to the account given by the Royal Commissioners, has produced most fatal effects in England. These have apparently been the result of two causes; *first*, Of too great liberality to the mothers of such children; and, *secondly*, Of a peculiarity in the law. By the common law of England, a fact is held to be fully proved by the testimony of one witness. Hence, when a statute was made on the subject of bastardy (6 Geo. II. c. 31, followed by 49 Geo. III. c. 68), it seems to have been thought a matter of course to hold the testimony of a woman to afford full proof of the paternity of the child she had borne, or of which she said she was pregnant. But, by the common law of Scotland, a fact is not proved without the concurrence of two witnesses—not that the direct testimony of two witnesses is in all cases expected to be found, but there must be circumstances held equivalent to two witnesses. Thus, if a woman allege that an individual is the cause of her pregnancy, she is only one witness; and therefore, before her oath can be received, there must be a proof of what is styled *semiplena probatio*, or proof of such circumstances of undue familiarity, &c. as may reasonably be held equivalent to another witness. To avoid expense, such questions may be tried by the Justices of Peace, but their decisions are liable to review by the Supreme Court of Session. Action is sustained at the instance of the woman against the man, for a sum in name of aliment to their child, and for her inlying expenses. The sums awarded are extremely small, on the principle that the woman is herself liable for half the expense so incurred. The effect of the rule of the Scottish common law has been to protect the female sex against the temptation to profligacy, said to have existed in England from the facility of fastening paternity on any unfortunate individual whom they might select.

In some of the larger Scottish towns, hospitals have, in imitation of England, been erected for the reception of the poor. In general, however, recourse has not been had to that form of provision. It is not attended with the inconveniences attached to the English workhouses, because only infirm persons or destitute orphans are introduced into them. But such hospitals have been held more expensive than small pensions to paupers, who can generally, especially women, do something for themselves, and receive aid from their neighbours and kindred. One hospital—that of St Cuthbert's, a part of Edinburgh—is not doubt said by a recent reform to have been so managed, that the paupers are supported at the rate of only about a shilling a-week for each individual. This, however, is as yet a novelty; but it proves what is practicable under very strict superintendence.

To return to England, a committee appointed by the House of Commons as far back as 1817, to consider the poor-laws, stated their opinion, "That unless some efficacious check were interposed, there was every reason to think that the amount of the assessment would continue to increase, until, at a period more or less remote, according to the progress the evil had already made in different places, it should have absorbed the profits of the property on which the rate might have been assessed, producing thereby the neglect and ruin of the land, and the waste or removal of other property, to the utter subversion of the happy order of society, so long upheld in these kingdoms." This report was followed by the 59th Geo. III. c. 12, authorizing the removal of Irish and Scotch paupers, the appointment of representative vestries, assistant overseers, &c. These proved mere temporary palliatives. The evil went on, confessedly increasing and extending, to more and more parishes. At length, during the administration of Earl Grey, the statute now in force was passed, 4 and 5 Will. IV. c. 76.

It is one of the misfortunes attending an erroneous system of policy, that, like the bad habits of an individual, it cannot suddenly or effectually be altered, without producing considerable inconvenience, if not hazard and distress, to the general system. The question is apt to occur, Why did not the English Legislature at once adopt the Scottish system? The answer is, That the pretended omnipotence of Parliament would have been unequal to the task of carrying such a reform into effect. To withdraw by one fell swoop at least five millions Sterling from the subsistence of able-bodied persons in England, would have produced a convulsion, to encounter which, the resources of the state, either civil or military, must have proved unequal.

The measure to which recourse was had amounts to this: His Majesty is authorized to appoint a Board of three members, removeable at pleasure, as Commissioners to carry into effect the Poor Laws. They are authorized to appoint Sub-Commissioners, not above nine in number, to whom they may delegate much of their powers. This Board of Commissioners is authorized to make rules, which are to have the force of laws, for the management of workhouses, and the poor generally. They are authorized to unite parishes, with a view to the joint-construction or use of hospitals for the union; to direct Boards of Guardians, to be chosen for these unions; and also, if they think fit, for other parishes. In the election of these guardians, proprietors are to have a vote, and to vote double if they are also possessors. Those rated as possessing property rated below L. 200 per annum, to have one vote, and those above that amount, two votes. Those above L. 400 to have three votes, and proprietors to vote by proxy. But all are to be subject to the Board of Commissioners, who may appoint hospitals to be erected, and sanction the borrowing of money for that purpose. No guardians, or others employed in executing the poor-laws, are to be allowed to furnish articles granted or distributed as parish relief.

The enactments of the statute are very specially directed towards remedying the evils resulting from bastardy. In such cases, the mother is bound to support her child, and to have no claim against the putative father; but if she be unable to maintain the child, the parish have an action against him. Her oath is no longer to expose him to imprisonment; and in the claim against him at the instance of the parish, the law of Scotland is adopted so far, that the woman's oath must be corroborated by other evidence, before it can be permitted to fix on any man a liability to relieve the parish of the maintenance of her child. No part of any sum recovered from the man is to be paid to the mother of the child. Farther, if a man marry a woman who has children, whether legitimate or illegitimate, her children are to be considered as a part of her family, and he is bound to support them.

But the principal object of the statute appears to be to put an end by the strong power of government to all out-door relief, and to refuse parish relief, in any form, except within the walls of a workhouse, to the rules of which the inmates are to be required to submit. The Commissioners are to enact and enforce the rules, and, where practicable, to place the males, the females, and the children, in separate workhouses. But the Justices of the Peace may, at the expense of the parish, order relief and medical attendance to poor persons seized with illness in their own houses, or to travellers absent from their place of residence.

The view of the framers of the statute apparently has been, that able-bodied persons will endeavour to find employment and subsistence for themselves, rather than submit to the restraint and servitude that may be imposed on them by the rules of a workhouse.

If this statute have the effect of restraining the tendency which the former practice had to produce that gross corruption of female morals which the Royal Commissioners describe, it will undoubtedly prove of high value. In other respects, however, the statute is, in the first instance, merely a palliative. It does not grapple with the absurdity of attempting to support the whole members of a community, in the enjoyment of plenty, whether they earn that plenty by their industry or not. This is the impracticable, unnatural, and impolitic object which the law of England has attempted, and still attempts, to accomplish. Like all prior attempts to mend the practice of a law radically erroneous, this statute will do no good, unless it be treated merely as a preparatory step to reach the principles and practices of the law of Scotland. For that purpose, it will not be enough to enforce very severely the rule of giving no relief to able-bodied persons, except in a workhouse, to the regulations and labour enjoined in which they strictly conform. It will farther be necessary, that, while the kind of food allowed there is wholesome and sufficient, it shall not, as formerly, be of such a description as an industrious man with a family cannot afford. The object must be to drive men to industry and frugality, by giving them a distaste for dependence on a public provision. If this object be not accomplished, to the effect of rendering an alteration of the general law practicable, nothing effectual is done. The act will be regarded merely as a statute against frail and poor women. A time of peace is unfavourable for the accomplishment of the object in view. A law explicitly denying parish charity to able-bodied persons, and adopting the law of Scotland as to the aged, and those unfit for labour, might have been a practicable measure in 1808 or 1810, when all men could easily find employment, public or private, while war was consuming its tens of thousands, and agriculture and commerce a forded ready occupation in every quarter. We doubt of the su cess of the plan, in the present state of things. The extraord nary powers, legislative, administrative, and judicial, conferred c the three Commissioners and their nine delegates (already, in d rision, styled the Graces and the Muses), which constitute the lords and dictators over all parishes and all the poor, remind t too much of old times in Scotland, when the government trie to make up for the weakness of which it was conscious, by tl high tone and boundless violence of its threatenings, and tl fury of its penal enactments. In the mean while, we of Scotlar wish every degree of success to our brethren of England in the attempt to heal a gangrene of 250 years' endurance, which a pears, after all, not so pernicious to the rich, whose wealth on it affects, as to the poor, whom it sinks into a state of intellectu and moral degradation, and who, but for this evil in their ins tutions, form naturally the best, the bravest, the most generou and the noblest race of human beings that have hitherto a peared on this globe,—excepting always, of course, their nort ern neighbours and admirers. R. F.

## REMARKS ON THE REPORT OF THE HIGHLAND SOCIETY ON GENERAL SHOWS OF LIVE-STOCK.

THAT the determination of the Highland Society to exerci in future, discrimination in those breeds of live-stock which shou be encouraged by their premiums at the general shows, would its promulgation give universal satisfaction to breeders, was a c cumstance not to be anticipated. It was expected that breed would take offence at the proscription of their favourite bre Accordingly, we understand, that umbrage has been tak particular districts of the country, at the report of the So which appeared in the last Number of their Transactions.

We hope it will not savour of disrespect even to the dices of breeders, were we to attempt the correction of m views, which are known to exist in highly respectable qu on the subject of this report. That breeders are somet fluenced by prejudice, is a position which we fear cann nied; else, why are those breeds which have been proved to be most profitable not cultivated in every district of the country suitable to their nature? After going over a pretty extensive field of observation, we are forced to the conclusion, that prejudice, or partiality, or whatever softer term may be chosen to be applied to the feeling, in regard to the breeding of stock, arises solely from contracted views of the importance of that branch of husbandry to the country. Confining his desire of a character for eminence within the limited district in which he is located, the breeder is too apt to neglect the fame of his country, and in this neglect to sacrifice his own interest. His interest is obviously involved in the cultivation of that breed which is most profitable in the circumstances in which it is placed. Do breeders generally consider these circumstances in regard to the *kind* of stock which they should breed? We are sorry we cannot affirm this question.

On taking a general survey of the cattle in Scotland, a vast variety of breeds, as they are termed, present themselves. At first glance the surveyor might be impressed with the conviction that the circumstances in which these cattle are placed are as various as the breeds. On closer examination, however, he will find that different breeds exist under the same circumstances; and, on inquiry, he will learn that the only reason which can be given for the cultivation of such varieties of cattle, is, that they have existed for generations in the same district. And such is the tenacity with which breeders retain the breeds of the district, as they are emphatically called, that the surveyor would probably give great offence, were he but to suggest that a much superior breed to theirs might be introduced into the district. It is this overweening partiality which breeders exhibit for cattle of *particular districts*, instead of *particular breeds*, which we call prejudice; and which materially prevents the extension of improvement in cattle.

After such examination into the cause of the existence of so many breeds of cattle in Scotland, the sympathy of the surveyor may be excited by the display of natural feeling which he witnessed in those men who love the spot of their birth, and every thing which has surrounded them as long as they can remember. He would, perhaps, wish to indulge them in the enjoyment of every loved object, and would not wound cherished feelings by depriving them of the cattle whic have long possessed, however unprofitably, for others of properties they are ignorant.

This would be good policy were the subject a mat feeling merely; but in these times, agriculturists, farm well as breeders, have to struggle for existence, and if be shewn that one breed of cattle will leave more profi another under the same circumstances, then that bree wilfully culpable, and instrumental to his own hurt, w glects or refuses to adopt it.

It will be an easy task to prove that all breeds of cat not equally capable of being profitable. We suppose it acceded, that an ox which attains the greatest weight i shortest time is more profitable than another of opposit perties. It is surely more profitable to obtain L. 20 for year old ox, than for a three and of course a four yea The quantity of food consumed, however, is an importan in producing this result. Should the value of the food sumed by the two-year old amount to as much as that con by the four, the profit would not certainly be considerable still the two-year old is the animal which should be pref as the risk of life is much less over two than four years. notion that an ox, to attain weight and fatness in a short must consume as much more food, is prevalent in many ing districts in Scotland; but no notion can be more erron for it is not the quantity or quality of food alone which the ox to attain weight in a short time. The nature of th mal must be of that kind which is favourable to the acqui of flesh before the food can exhibit its feeding properties. must first exist in the ox a disposition to fatten. This can only be found conjoined to symmetry of form. gether superinduce early maturity. All these proper produced only by judicious breeding. It follows as a course, that the ox which possesses a symmetry of form, disposition to come early to maturity, will lay on a tity of flesh and fat, with the same quantity of food, possessing opposite qualities.

Nor do all the vast varieties of breeds of cattle in possess symmetry of form, disposition to fatten, and come to early maturity? If they do, why are they kept on hand by breeders, feeders, and graziers, till they are at least four, and mostly rising five year old? Why keep an ox till he is four, when he may be fattened at two? If they do not, why cling with so much tenacity to dull feeding breeds, when kindly feeding ones can be obtained?

In the progress of their General Shows over the country, the Society have offered premiums for every breed of cattle. Till these exhibitions took place, it was impossible to know what degree of perfection any breed could be brought to. That fact having been ascertained, the Society, tutored by long experience, have resolved to confine their premiums to the encouragement of those breeds of cattle which have exhibited superior qualities at their General Shows. They thus desire to shew, that their future operations shall be conducted on principle, and not at random, as has hitherto been the case; and if, in the general application of that principle, some of the existing breeds of cattle should be wilfully overlooked, or proscribed if you will, the speedy relinquishment of the proscribed breeds will be beneficial to the country at large, however their proscription may, for the time, hurt the feelings of some breeders.

Of the very various kinds of cattle which exist in this country, the exclusion of many of them from competition for the Society's premiums would not be so insurmountable a task, as many of them are nearly on a par as to qualities, as the selection of those few breeds which deserve to be encouraged. To those persons who have attended most of the general shows, it is obvious that the Fife and horned breed of Aberdeenshire have cut much the least conspicuous figure. A few good animals have no doubt been shown of both breeds, but such exceptions form no guidance for a general rule. Indeed, the Society have wisely determined not again to encourage the exhibition of aged and pampered animals. These may be legitimate enough objects for sweepstakes between individuals. The funds of the Society will now be devoted to more useful objects,—the enforcement on the attention of breeders of all those qualities which constitute the highest attributes of perfection in cattle, and which alone can render them sources of profit.

For our own parts, we would have laid the bann of proscription on many more breeds than the Society have done. The Fife and horned Aberdeenshire are undoubtedly coarse breeds: round bones, thick hides, lumpy points, accompany coarse grain of flesh, and little fat in early life. The Caithness and Orkney breeds are even inferior to the two which we have mentioned. The brae cattle of Moray, Banff, and Aberdeen, though good travellers, are dull feeders; and the generality of the Angus are not much if any better. Being hornless they get the preference for open court-yards in winter. All these breeds occupy fine grazing and lowland districts of country, which might be more profitably occupied by others. Let us see what is the nature of those grazing districts for breeding stock.

The face of Scotland presents, in an agricultural point of view, three great features,—highland, upland, and plain. The highland is composed of primitive rocks, and covered with brown-coloured heath and peaty soil. The upland is of the transition series of rocks, and is covered with green grass. The plains are composed of alluvial deposites. The highland, from their great elevation and scanty pasturage, is only suited to the small and hardy race of black-coloured cattle, the type of which may be seen in the Skibo breed, and of which the "Northern Highlanders," as they are called, in general form favourable specimens. Th black-faced breed of sheep alone can find subsistence in this alpin region. The grassy or upland district is admirably adapted t the rough-haired and hardy but noble Kyloe. The Skibo anc Kyloe display similar points, which are all good, and seem differ only in size, a property which naturally arranges them the relative altitudes of their respective districts. The Chev sheep are indigenous to this beautiful region. The plains adapted to the heavier and larger races of cattle and sheep, as Short-horns and Leicesters.

Now, of all the cattle which have been cultivated in country, there is not a breed which approaches so nearly t fection in the eyes of breeders as the Short-horned. Th eminently qualified to be nurtured on the plains, and in s tuations they are the most profitable cattle known. Ma jections have, no doubt, been made against their introduc the north of the Frith of Forth. They are represented quiring more and richer food than the native black breeds; as being more tender in their constitution; and so forth. Such objections have not their origin in experience. On the contrary, experience shews that the short-horns of Berwickshire, in the Merse, and the Lammermuirs, are capable of filling any situation of soil and climate. They will not, it is true, thrive on foul land out of condition, or when exposed day and night to wet and cold weather; but what animals can *thrive* under such treatment? None that we are acquainted with, although we have seen too many cattle exposed to the elements, as if they had been formed of materials as obdurate as rocks; but a better practice is, happily, obtaining possession in this country, and a little longer time will soon show breeders, that kindness in every respect as to food and shelter is a better nurse for their cattle than the cow-leech, and a better amplifier of the purse than neglect and starvation.

Upon the whole, then, the North Highland, the West Highland, and the Short-horned, form the three breeds of cattle in this country which we consider to possess the essential properties of symmetry of form, disposition to fatten, and early maturity, in the greatest degree, in their respective situations; and as a necessary consequence, they will prove the most profitable to the breeder. In like manner, the Black-faced, Cheviot, and Leicester sheep, may respectively occupy the same situation as these cattle. More than these three breeds of cattle and sheep, we see no necessity to *encourage* the extension of. An exception may be made of the Ayrshire breed, which is strictly confined to the dairy.

The Society have not yet restricted their views so narrowly as we have done. They may yet see cause to adopt our opinion: the sooner, we think, the better for the breeder. But, at all events, they have made a beginning, and we have no doubt that, in the course of events which are progressing towards a perfection in agriculture which it has never yet attained, only those cattle and sheep, grains, roots, and grasses, will be cultivated which will yield the largest possible produce, and the greatest profit, along with the most perfect field culture. These anticipations are not meant for Utopia; they may, without difficulty, be realized in our own " braid Scotland."

## ON AN IMPROVED METHOD OF MOUNTING THE CRADLE-SCYTHE.

So far as I recollect, the Rev. Mr Farquharson of Alford stated, in his former communication to the Highland Society on scythe-reaping, that latterly no appendage whatever was used on the scythe, in his neighbourhood, for assisting in carrying round the cut corn to the swathe; and that scythe-reaping had been brought to its present pitch of perfection by laying all that sort of thing aside, and using nothing but the common hay scythe. In his last paper, however, he seems to admit the necessity of using a bow, except when the crop is much lodged; but even in that case I am clearly of opinion that some appendage on the scythe is indispensably necessary, and certainly would prefer a small rake to any thing I have yet seen. I have now had another year's experience of the cradle-scythe,* and have no hesitation in saying that it is the most efficient implement of the kind that I know of. Its superiority to the "long curved handle" consists, as I formerly stated, in the comparative ease with which it is wrought, which every person who has used it, and with whom I have talked on the subject, readily admits. I do not say that an experienced mower will not make sufficiently good work with a scythe fixed to the long curved handle, provided a rake be attached to it; but let any one compare such and the cradle-scythe at work together, and he will be at no loss to discover the preferable implement. Before the introduction of the cradle scythe, the scythemen used to complain a good deal, for some days at the commencement of harvest, of *sore sides*; but no such complaints are now heard of. This is easily accounted for: Before the cut corn can be laid nearly square to the uncut with the long curved or common handle, the mower's left hand requires to go at every sweep considerably farther round to the left than with the cradle-scythe, owing to the position of the handles on the sned; and this, of course, occasions a corresponding turn of his body in that direction, which may be very sensibly felt.

The rake can be made very light; in fact, very little, if

---

* Cradle, a frame for a scythe.—*Bailey's Dictionary.*

thing heavier than a bow, and the expense of either is trifling. I find that one bar about 3-4ths of an inch thick quite sufficient to hold the teeth; and for all the cost I would recommend having rakes of various lengths, of from ten to thirteen or fourteen inches. For one of the shortest size, three teeth are commonly used; but I think they are no worse of four; and experience has taught me that much shorter teeth than those generally in use answer equally as well, and are much more easily disentangled of the cut corn. The teeth should be curved a little, like the blade of the scythe. Last harvest, a friend of mine suggested it as an improvement to have rakes of a circular form, and made so as to move out and in on a hinge at the lower end, in order to suit the different inclinations of the crop. Coinciding in his opinion, I got some of them made for a trial, and have the satisfaction to say, answered remarkably well. The head of the rake is eleven inches in length, and is curved to form a segment of a circle of about one foot four inches radius. The uppermost teeth is from five and a half to six inches long, and each of the three lowermost extends an inch beyond the one immediately above it. Instead of the rake being fastened to the heel of the scythe, as mentioned in my last letter, a piece of iron with two upright plates is clinked to the back of the scythe, about an inch from the back end of the blade. The rake is inserted between these upright plates, as in a socket, and a round nail with screw and nut is passed through them to keep the rake in its socket. By this contrivance, the rake can move backwards or forwards on the round nail as occasion requires. It is held steady, in whatever position it is placed, as follows: The small iron rod that connects it with the left handle of the frame is made thin at the end, and has seven or eight holes in it about 5-8ths of an inch asunder. This part of it is bent so as to correspond with the limb or plane of the handle, to which it is held fast with a nail and thumb-screw, and by which it is readily shifted. The nail is put through the handle, from the lower side, six inches above where the handles unite. When the corn stands upright, there is no difference in the position of the rake to the blade and handle of the scythe from the straight rake, except that the former is placed on the back edge of the blade, and the latter fixed into an eye-headed wedge at the heel of it.

both stand perpendicular to the blade, and it is only when the corn lies away from the scythe that the position of the circular rake differs from that of the other. If the corn be lodged or partly laid over with wind at the time of mowing, the circular rake is set back at the top by shifting the holes in the end of the rod that holds it fast to the handle, so as to answer the lay of the corn; and it is in this respect that it has the advantage of the straight-headed rake.

Last year, part of my crop, both oats and barley, was a good deal lodged; indeed, some of the former, on soft mossy land, were laid flat and twisted in every direction. The operation of cutting was consequently more tedious; but all was performed with the scythe in good style, and at much less expense than it could otherwise have been done. In instances of this kind, I would humbly recommend to cut *in* instead of *out* of corn, as it is usually termed. I adopted this plan last season, and really think it a good one. At first the scythemen were averse to it, but in less than half a day they changed their opinion, and acknowledged it to be the best. I commenced with it in a field of pretty ripe potato oats, which were a good deal lodged, and the grain dropping off in the working; and it was soon discovered that there was less loss of grain, a much freer cut, fewer rakings, and a neater stubble,—circumstances of no small moment to the farmer. The corn can be laid round, as even, and nearly as square, the one way as the other; but cutting *in*, if the crop is thick, seems rather hardest for the uptaker, which is owing, in some measure, to the free working of the scythe on the right hand, which allows the operator to come more speed.

Now that that very important operation, scythe-reaping, has become common in many parts of the country, and is practised in various ways in different places, it occurs to me that it would be an object well worth the serious consideration of our agricu tural societies to promote its improvement, by holding compet tions, and awarding prizes to the most meritorious competitor as in the case of ploughing matches*. I. F

---

* We cordially recommend this suggestion of our intelligent corresp to all agricultural societies.—EDITOR.

## ACCOUNT OF AN APPARATUS FOR STEAMING FOOD FOR HORSES.

This paper concludes that series which has appeared in this Journal, descriptive of the various machines requisite to prepare food for domestic animals, particularly the horse. It gives an account of the apparatus for steaming the food, and, like the others, it illustrates it by a wood-cut.

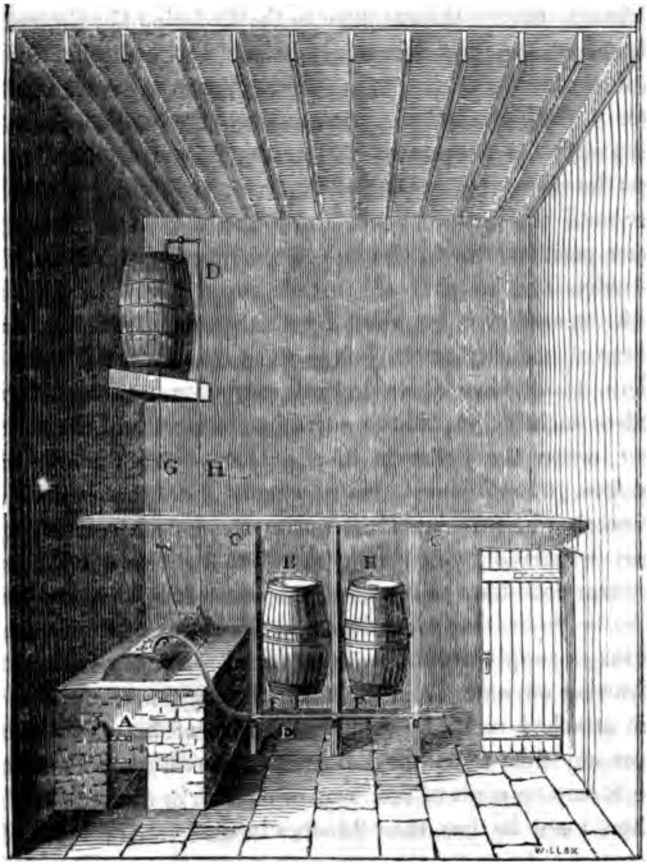
The common apparatus for steaming has been already partially described in vol. iv. p. 378, but we now give a more detailed description of two of them. Various forms of the apparatus have been adopted, but they are comprised in two classes, those with an open and those with a close boiler. In the former a boiler of cast-iron, with a capacity of forty to fifty gallons, is set on a furnace, the edge or lip of the boiler is double, forming a groove about 2 inches deep, and 1½ inch wide, running quite round the mouth. The vessel which contains the material to be steamed is usually made of sheet-iron, with a bottom perforated like a riddle, and fixed into the vessel at about 1½ or 2 inches from the lower edge; it is furnished with an iron bow, attached to gudgeons placed a little below the line of the centre of gravity of the vessel, so that it may be easily overturned when suspended by the bow, for the convenience of emptying it, and is retained in the upright position by a catch; it is also furnished with a close cover of wood, or sheet-iron. In using the apparatus, the boiler is filled with water, and, at the same time, the groove is likewise filled. The steaming-pan is then placed on the top of the boiler, its lower edge falling into the groove, the contained water forming a hydraulic lock or seal, preventing the escape of steam, at a pressure a little above that of the atmosphere. The furnace being kindled, the water in the boiler soon produces steam, which, rising into the upper vessel, pervades every part of it, and being continued for a sufficient length of time, produces the effect. This in the case of potatoes will require from thirty to forty-eight minutes after the steam is up. As the steaming-pan with its contents must be lifted from off the boiler, a crane becomes a necessary part of the apparatus. The crane is worked in the usual manner, and by means of a rope or chain, a man can remove the pan with its contents; and, while thus suspended, the catch of the bow being disengaged, the contents are discharged into a trough prepared to receive them.

One advantage of this kind of apparatus is, that the boiler being open, can be applied to the purpose of boiling grain or other substances, or for any purpose in which hot water may be required. The expense of the boiler, pan, and crane, for an apparatus of this description, to steam for ten to twenty horses, will vary from L. 7 to L. 10.

Of the apparatus for steaming with a close boiler, there are a variety of forms, some with a hemispherical boiler of cast-iron, others with malleable iron boilers of the common waggon shape. Of these we consider the latter to be the most economical in the article of fuel, though a little more expensive in the first cost; hence their adoption may be regulated by the price of fuel in the localities where they are to be used. The steaming vessels may be varied to suit the situation and circumstances; they may be chests of deal, or of sheet-iron, or casks; the latter in most cases will be found the most suitable. The other auxiliary apparatus, as steam-pipes, water-cistern, valves, stopcocks, &c. may be adopted of such materials as shall be most conveniently procured. The water-cistern may frequently be dispensed with, and the boiler filled through a funnel and stopcock at each operation.

The annexed cut exhibits an arrangement that has been proved to answer every purpose, without any unnecessary expense. The view represents the interior of the steaming-house. The furnace may be set either to the right or the left, or in the middle, according to the position of the chimney, and the steaming vessels distributed as the situation requires. The arrangement here shewn has been found to afford every facility to the operation.

The boiler, which is 3 feet 4 inches long, 18 inches wide, and 21 inches high, is set in a brick furnace; the fire-grate being placed under the front end of the boiler, and a flue carried from that quite round, before entering the chimney. By this arrangement, the fire or heated air is held as long as possible in contact with the boiler, which takes up the greater part of the heat evolved from the burning fuel; and it is worthy of remark, that he effect of the fuel depends much on the proper construction



of the furnace and flues, to bring out the greatest effect from a given quantity of coal. The boiler is provided with a man hole, to the door of which the steam-pipe is attached, and both can readily be removed at pleasure. It is also furnished with a safety-valve, which need not be loaded above 2 lb. to the square-inch; a feed-pipe G is also attached by a coupling screw to the boiler, and its other extremity to the bottom of the water-cistern D, placed at not less than 6 feet above the level of the boiler. To the rod H, after passing through a small stuffing-box in the top of the boiler, is attached a stone float, or a hollow copper ball, immersed in the water of the boiler, the upper end of the rod being jointed to the lever at D; the opposite end of the lever is connected to the rod of a valve, placed at the bottom of the cistern, closing the entrance to the feed-pipe G; the rods at each end of the lever being duly balanced with the float on the one side, and the valve on the other. When the surface of the water in the boiler falls by evaporation, or any other cause, the float losing the support of the water, falls along with it, and opens the valve at the mouth of the feed-pipe; letting a quantity enter until the surface again rises, carrying up the float to its former position, which, through the medium of the lever, shuts the valve, and so cuts off further supply, until a repetition of the operation is required by further evaporation. As an additional security, two guage-cocks are inserted into the boiler; these have their inward extremity prolonged downward to such length, that one terminates in steam, the other in water, when the boiler is in a proper state; the one cock, therefore, when opened, emits steam, the other water. If too much water is introduced, the steam-cock will blow out water, a part of which may therefore be drawn off, and if the water-cock blow out steam, the water has fallen too low in the boiler, indicating some defect in the action of the feed-pipe, and that a supply should be introduced. For the conveniency of drawing off water from the boiler for any purpose, the nozzle A is attached to it, by which a supply of hot-water can be got at any time when the boiler is in operation. The steam-pipe E may be made of cast-iron, or of lead, or even of tin-plate; it should not be less than 2 inches in the bore, brought off in the manner shewn in the cut, with a branch to each steaming-vessel. The steaming vessels or receivers B B, if casks are used (which are the most convenient), are suspended by gudgeons between the posts *C C*, poised in such a manner, as to make them easily overturned, for the purpose of discharging the contents; each cask is furnished with a false bottom perforated to admit the steam; while a short nozzle F, of about 4 inches long, of 1½ inch pipe, is fitted to the real bottom of the receiver, projecting outwards; the connection between this and the steam-pipe is formed by means of a piece of copper or tin-plate tube, 6 inches long, which slides externally upon the branch of the steam-pipe, and when the end of the branch is brought to coincide with the nozzle, in the bottom of the receiver, the sliding piece is pushed forward till it embrace both parts, thus forming a sufficient connection between the boiler and the receiver. The size of the casks will be regulated by the quantity required to be done; but the boiler here described will supply steam for three casks of 30 to 40 gallons each, or a supply for 16 or 20 horses. The time required for the operation will be about one-half to three-quarters of an hour after the steam is up. The covering of the receiver is by no means of importance;—a wooden cover, two or three folds of thick sacking, or an old sack, thrown over it, does quite as well as a steam-tight cover. The true bottom of the casks should be perforated with a few holes, to allow the escape of condensed water, which also carries off the colouring matter of the potatoes. When the operation is concluded, the steam-pipes are disengaged; the ends may be stopped with a wooden plug; or by the stop-cocks, when such are used; but, at the same time, proper attention must be given to the fire, that the production of steam may be checked. The casks are now overturned, the contents discharged into a trough, or what is better, a large close wheel-barrow, and the mixture prepared according to the practice of the establishment.

In this kind of apparatus, it is evident that boiling of any substance cannot be done in the boiler itself; but it is well known that any substance can be boiled in a separate vessel, by introducing steam to it either directly to the liquid that it contains, or by applying the steam through metallic pipes, or into a vessel surrounding the first. These, however, are attended with considerable expense; as distinct vessels from those used for steaming roots, &c. must be employed. It has also been ascertained, though perhaps not generally known, that grain of any kind cannot be dressed or cooked by dry steam applied to the dry grain. If the steam is at a low pressure, or a little above that of atmospheric, a species of parching is produced on the grain so treated; and if steam of very high pressure is applied, the grain may be entirely carbonized. An intermediate, and very simple process, has, however, been found, whereby grain of any sort can be completely boiled, which is done by soaking the grain in water for a period of from six to twelve hours, according to its state of dryness, and then placing it in the receiver described for steaming roots, and applying steam for an hour, the grain will come out completely boiled. From this it may be inferred, that each grain becomes a little cauldron, containing as much absorbed water as serves to boil it by the application of steam; but whatever be the *rationale* of it, we are thus provided with a simple and efficient steaming and boiling apparatus, applicable alike to the cooking of juicy roots or tubers, and dry grains. This steaming apparatus, with a straw cutter and a corn-bruiser, such as we formerly described, will furnish a complete set of implements for preparing food for horses; or, the corn can be bruised at the common mills.

In our former article, the price of such a steaming apparatus has been quoted at L. 5. This, we apprehend, is too low; but we have the authority of Messrs James Slight and Company, model and machine makers to the Highland and Agricultural Society, to state that they are in the practice of fitting them up at prices varying from L. 8 to L. 12; and, when fitted up in a very superior style, with stop-cocks on the steam-pipes, and other appendages, they rise to L. 15.

That horses on a farm may be kept more economically on prepared food than in the state and manner in which food is usually administered to them, we have no doubt. The fact, however, will soon be ascertained, in consequence of the premium which the Highland Society has just now announced on the subject. The results of the experiments which some farmers will make, will, we fondly anticipate, prove the facility of preparing food, and economy in the use of it. We have the authority of the owners of some of the coaching and posting establishments in Edinburgh, for stating that the saving which will arise from the use of prepared food, in the keep of forty horses, will amount to L. 140 a-year. We have also the high authority of Mr Dick, the Professor of Veterinary Surgery in Edinburgh, for saying that the general health of horses under work, is much better on prepared than unprepared food.

> ‘ It will appear obvious,” says Mr Dick, in a paper on the subject, which appeared in this Journal (vol. iii. p. 1029), “ that the grand desideratum is to give food containing as much nutriment, and in as small bulk, as is consistent with the economy of the animal. If this problem is solved, it will follow, as a corollary, that it will be important to give that food which has been found best suited in its proportions, in such a state as is best suited for digestion. This is a point, however, worthy of consideration, and naturally suggests the question, How is the body supplied with nourishment by taking in food into the stomach? The common notion is, that much depends, as I have indeed before mentioned, on the hardness of the food; and it is a common saying, in

order to show off a horse which is in condition, "that he has plenty of hard meat in him." Now, this is a very silly and erroneous idea, if we inquire into it; for, whatever may be the consistency of the food which is taken into the stomach, it must, before the body can possibly derive any substantial support or benefit from it, be converted into chyme,—a pultaceous mass; and this, as it passes onwards from the stomach into the intestinal canal, is rendered still more fluid, by the admixture of the secretions from the stomach, the liver, and the pancreas, when it becomes of a milky appearance, and is called chyle. It is then taken into the system by the lacteals, and in this fluid, this soft state, and in this state only, mixes with the blood, and passes through the circulating vessels for the nourishment of the system.

"Now, if the hardest of the food must, in this manner, be broken down and dissolved, before it can really enter into the system, it must appear evident that something approaching to this solution, if done artificially, would greatly aid the organs of digestion in this process, and that thereby much exertion might be saved to the system, and, at the same time, nourishment would be more rapidly conveyed into it. It is with this view that I would recommend the general adoption of cooking food for horses."

Captain Cheyne of the Royal Engineers, who has been succeeded in the posting establishment by Mr Isaac Scott, at length, after repeated experiments, fixed upon the following mixture as the most economical and nutritious for horses performing fast work, on which they exhibited a finer condition than on a larger quantity of food without preparation. Each horse was given 15 lb. of the following mixture:—

| | |
|---|---|
| 10 bushels cut straw, . . . . | 90 lb. |
| 6 ditto bruised oats, 29 lb. per bushel, | 174 |
| 1 ditto bruised beans, . . . . | 59 |
| | 323 lb. |

| | |
|---|---|
| Or, of oats, . . . . . . | 8 lb. |
| beans, . . . . . . | 2¾ |
| straw, . . . . . . | 4¼ |
| | 15. lb. to each horse, |

And at night, in addition to the above, about 25 lb. of the following mixture:

| | | | | |
|---|---|---|---|---|
| 1 boll of potatoes, at 7s. 6d. 5 cwt. (steamed), | 7s. 6d. | 560 lb., | each horse | 21½ lb. |
| Fine barley-dust, 10d. per stone, . . | 2s. 1d. | 36 | | 1½ |
| Oat-straw, at 6d per stone, . . . | 1s. 0d. | 40 | | 2 |
| Salt at 3d. per cwt. . . . . . | 0s. 2d. | 6 | 2 oz. | 25 lb. |

The cost for each horse, is, therefore, about 5d. for supper, and about 1s. for daily forage and cooking, in all about 1s. 5½d. when the whole food is purchased at market price.

We would also recommend to all our readers who are interested in this important branch of rural economy to turn to the article, " A method of preparing food for horses," vol. iv. p. 378, in which the process is detailed, and much useful and practical information given on the subject, with some valuable suggestions as to the application of the system into farm management, which, in these times when economy in every department requires the closest attention, the adoption of the cooking system might be productive of highly beneficial results. Let the farmer examine into the cost of his horses' keep, and compare it with what has been done by others who have made saving of expense in that department an object, and he will easily satisfy himself that something may be saved out of his present expenditure in the article of feeding alone. We know that a vague notion prevails with some farmers, that when the articles are raised on the farm, the value appears much smaller than if they were bought in the market, and, to a certain extent, this is true, the article being procured at the cost of production; but then, let the farmer consider that if he can save a half, a fourth, or an eighth of his consumpt of horse keep, the portion thus saved is a clear gain, not only of the article at the cost price, but the realization of the profit arising from bringing it into market. Should he say, there is already as much horse food raised in the country as supplies all the demands, and the additional quantity which would by the proposed method be brought to market, will only serve to form an over supply and produce a reduction of price: An immediate remedy presents itself for this evil, which is, to have a smaller extent of ground for the keep of horses.

We have been told by farmers that the cooking system lessens the demand for *hay*, and that it is the interest of the farmer to increase the consumpt of that article. Were hay the only produce of the farm, this reasoning would be very good, but every one knows this is far from being the case, and, therefore, if the farmer requires less surface under hay, he will have more to devote to grazing; but, even viewing the matter in his own light, and supposing that a given quantity of hay must be produced; if he can, by adopting a more economical mode of feeding, produce a saving in the expense of working the land, he [illegible] afford to sell its produce at a lower price, which would [illegible] bring about the natural result of a greater demand for the article so reduced in price, as a greater number of horses could then be supported on the produce of the same extent of surface.

For our own parts we should be glad to witness the prevailing practice on farms, of raising and selling hay entirely abolished. The whole practice, particularly in Scotland, is quite derogatory to the fertility of the soil. The crop is never cut down till the rye-grass has ripened its seed, the object being the acquirement of as much rye-grass seed as will sow the crop of the following year, or will raise a sum of money by its sale. A crop of rye-grass seed scourges the land as much as any of the cereal grains. Under these circumstances, the first year's grass becomes a deteriorating, instead of an ameliorating crop, and in the second year it becomes less valuable for pasturage. The nutrient properties of the hay is also nearly destroyed, for the small wiry straw of the rye-grass is not so succulent nor so saccharine as the ordinary straw of the common oat. When to the deterioration of the quality of the hay, by allowing the grass to stand too long before being cut down, is added the negligent method of making it, and the necessarily great expense attending the making and delivering of it under the most favourable management, we question whether the price of 5d. to 7d. per stone of 22 lb. which is the usual price in the country, will repay the farmer so much throughout the rotation, as the depasturing of the same extent of land for two years with cattle and sheep. We believe it is generally allowed that the hay crop does not pay the farmer; at the same time, he conceives himself obliged to save some hay for the use of the horses in spring and autumn. But should it be proved that cut straw, along with grain and other ingredients in a particular state, is as nutritive to the horse as the hay and corn which are given to him in the usual manner, any inducement for making hay will be entirely removed; and, when private gentlemen, as well as owners of public establishments of horses, come to see the advantage of keeping horses on prepared to unprepared food, the general want of demand for hay in consequence, will, of course, supersede the necessity of making it. It will be found, we have no doubt, more profitable to the farmer, to send the produce of his grass-land in the shape of beef and mutton on the carcasses of cattle and sheep, than in the shape of hay on the cart wheels.

## OBSERVATIONS ON THE USES AND MANAGEMENT OF HEATH.

By Mr William Hogg.

Much has been written, and much has been done for the arable land of Scotland. The husbandman has varied his crops, made them follow each other in every order of succession, and not unfrequently different kinds of grain have conjunctly occupied the same field. The lands have been enriched with every kind of manure, and the surface has been excited to exert its powers by every kind of stimulus which man could invent, or experience testify was of a quickening influence. Implements of almost every shape have been invented for opening, cleaning, mixing and dressing the different strata. The powers of man and beast, and soils, and the influence of seasons, have combined to produce abundant crops; but there is still a soil of great extent which shews every mark of disregard, but which certainly will at no great distance of time engage the attention of both proprietor and occupant, and when their exertions have been successful, they will be astonished at the indolence of former generations, who allowed their extensive sheep-walks to lie under the dominion of a withered, worthless, unprofitable heath, and it susceptible of such easy improvement; and is it not unpleasant to see an easy-lying sheep-walk totally neglected, and overrun with a dense, dark, useless heath, and the name of the neglected glen or hill is perhaps that from which the family derive their hereditary honours? But it is not the absence of artificial ornaments which the writer here deplores,—these would be unsuitable and imprudent on many situations where heath prevails. It is the mismanagement, or rather total neglect, of those spontaneous productions which remote and elevated regions yield. Though the soil itself cannot be altered so as to give existence to more succulent herbage, yet the productions themselves may be so reclaimed as to render them more nutritious, more mild and grateful to the pasturing stock. All distant and alpine productions are apt to be disregarded; but heath, I think, is the most neglected. I shall at present first notice what are the principal obstacles which have prevented the improvement of heath; secondly, what are its uses; and, lastly, explain the most eligible method of its improvement. The obstacles to its improvement shall be briefly noticed. First, the distance at which heaths generally are situate from the proprietor's dwelling, or from the gaudy decorations of the country, their dull and *sombre* appearance doth not sadden the scenery so much as if they lay close to the neighbourhood; and hence neither their owners, nor the community at large, are anxious to have their gloomy colour changed; and, secondly, the soil which produces heath submits to improvement with great reluctance, and when the improvement is made, it is far from being permanent; and, lastly, the extraordinary altitude in which they are situate, and the immense depth of moss which produces heath, makes any attempt to propagate the softer grasses utterly impossible; and, I may add, their immense extent weakens every resolution for their amendment.* These obstructions are all real, and the last, which proceeds from the highness of the climate, it is not within the ingenuity of man to overcome.

I shall now point out its uses, or to what purposes it is serviceable at the present time.

The Celtic tribes had a method of preparing an intoxicating drink from a decoction of heath. This, mixed with wild honey, was their common drink at their feasts; and upon account of the cheerfulness it imparted to the spirits, Ossian calls it "the joy of the shell." The art of preparing this liquor is nearly lost, but thrifty housewives will, when other beverage is scarce in the winter season about the farm-house, put an infusion from the green tops of heath, and will make a third more of beer or ale from the same quantity of malt, and of the same strength and salubrity; but its most general and most profitable use is food for sheep, and to this it is applied over all Scotland. [*]

---

* I am aware that many tracts of heathy land have been reclaimed and subjected to the plough. On these places the ground was dry, and a short stinted heath covered the surface. For the most part, also, they lay low, were easy of access, and often were situate among agricultural spots; but the heaths to which I principally allude, spring from pure moss from three often to thirty feet deep, and often runs, with little interruption, seven, or sometimes twelve or thirteen miles in length, and two or three in breadth. All extensive mosses have been originally formed from decayed wood, which the devastation of man and the elements have levelled with the soil.

To even a careless observer, it will readily occur, that on some pastures heath must be the principal part of sheep's food, while others, on a different pasture, must taste of it very sparingly. On these two situations sheep employ it for different purposes. On the first it enters largely into the mass of food which the animal gathers; it has been their principal support since their infancy; they know of no other, and they have no troublesome desire for the succulent grasses. In the latter, it is medicative, and the perception of the animal prompts to the use of it with no other design. When the stomach is overcharged with soft luscious food, the feelings of the animal admonish it to go in quest of aromatic feeding to accelerate digestion, and this a small quantity of heath does. It warms and strengthens the tone of the stomach, and assists in the dissolution of the aliment, and prepares it for entering the intestines; and as soon as digestion is begun, the animal ejects a good deal of wind, which the warm and pungent quality of the heath is now beginning to dissipate. Sheep, who are natives of a heathy pasture, are in no danger of feeding to excess; they only satisfy, but doth not overburden nature, and though the animal is here smaller in the bone, and the viscera much less, the constitution is sound and hardy, and is in no danger of those maladies which arise from repletion.

Heath is also appropriate by nature to the feeding, and by its cover to rearing and hatching, of the common grouse. Its tender shoots are their principal food, and its retired recesses the spots chosen for incubation; but all their arts at concealment cannot protect them from the ravages of the corbie-crow, and other robbers, who range over the desert in quest of a subsistence. These seldom miss the spot where they are sitting, and greedily devour whatever they find, whether in an egg or animated state.

---

[*] To many unacquainted with the peculiarities of this animal, it may appear improbable, that it should cram such a quantity of food into its stomach, that its digestive powers is unable to manage. This, however, is often the case. On soft grassy pastures it often feeds to such excess, that it has considerable quantities to bolt back to make room for fermentation; for when this begins, the mass of aliment swells considerably, and there is no room for the process till so much be thrown back with the cud upon the ground.

I have often pitied the moor-fowl, in their exertions to defend their nests from the depredations of the corbie-crow and other relentless plunderers; but as they are not fitted by nature for a state of warfare, they are by no means a match either for the hawk or corbie. I have often seen these ravenous birds in the act of spoliation;—one case I cannot help here relating. A crow was attempting to rob a nest of its eggs. The moor-cock, with great clamour, attacked him in the air, knowing no doubt what was his design. I saw the crow cared neither for his noise nor attack. After sundry rencounters, the crow darted down upon the nest, and the hen left it with a loud scream. They both then set upon the crow, when the latter, finding he could not get the eggs sucked with that deliberation and leisure which gives a feast its due relish, flew over the heath, and I thought he was going to relinquish the design as impracticable. I was mistaken. He returned in a short time with another crow, and I then saw they would immediately carry their point. The cock came in contact with one of the crows in the air; the crow had clasped him in her talons, and when she loosened her hold, the moor-fowl fell straight to the ground. I thought he had been killed, and ran to see what method of destruction the crow had so instantaneously inflicted. He was not dead, but cowering among the roots of the long heath, and was sore hurt by closing with his antagonist in the air. When I approached he took to the wing; his feathers I saw much disordered, and he was doubtless sore hurt. Both parties left the spot, and when I left it, I saw the crows return, and without farther molestation they no doubt accomplished their design. I have often relieved the grouse in the same manner; but it was always only a temporary delay to the calamity, for as soon as their nest is discovered, these ravenous birds never give up the design till it is pillaged.

Moor-fowl have their permanent residence only where heath prevails. On grassy land, though never so mountainous, they indeed may be seen in pairs or flocks, travelling from one heathy district to another. It is a hardy fowl, well known to the sportsman, and is often seen feeding on the young sprigs of heath in the shock of the tempest, and amid the darkest night.

Again, when the blossoms of trees and plants are faded, or have given place to the fruit, the heath offers inexhaustible stores of honey to the wild and domestic bee. But there are immense tracts of this shrub to which this insect never roves, and over spaces where they travel are many blossoms which they never explore; hence much of this fine vegetable syrup retreats back into the plant, or is left "to waste its sweetness in the desert air;" but in this liquid, extracted by these diligent purveyors, resides that spirit which inspired the Celtic bards to sing of the deeds of other times then long gone by.

The snipe is also an inhabitant of the lonely desert, but it occupies a heathy district only, in common with other wild regions. It is a fen bird, and never leaves the marshy spots at any season of the year; and when heavy snows close up the face of the desert, it resorts to the openings made by springs; and though no creature, through the whole course of its life, can be more cold and comfortless-like, wading and sucking in a puddle, yet none has a more fed-like and glossy appearance.

To the heaths sundry species of migratory birds resort through the summer months, for hatching and rearing their tender young. Here, in these solitudes, and far from the disturbance of man, they enjoy unmolested those compassionate feelings which every creature fondly cherishes, as it contributes to the wants of its helpless offspring. The wild duck selects the thickest bush of heath she can find, always within a yard or two of a stream or rill; while the plover and the lapwing choose the more prominent and most obvious point of land they can find, yet their retreat is seldom discovered, and would still be more seldom, if her wailings did not admonish the vagrant boy that all she held dear was just in the neighbourhood.

As food and shelter for animals, the above are some of the uses of the heath, but formerly it entered more completely into the accommodations of human life, if not also into some of its embellishments; but as it is every season less employed for such purposes, and will ere long be utterly discarded, it is needless to explain them here; I shall therefore proceed to explain the most eligible method for its improvement.

Heath is a plant which shoots wild and free, and any alteration of the soil on which it stands, or on the structure of the plant itself, dwarfs its size, and directly checks its growth; yet it has this peculiarity, that, if the roots be left untouched, it will by no means relinquish the soil, if, previous to the destruction of the plant, they have been in a living state; and destroy the old heath by what method you will, if the roots have been undisturbed, a succulent crop of young heath will immediately cover the ground; and to accomplish this necessary purpose, burning is the easiest, the most effectual, and the most expeditious. Let me describe this process a little. Muir-burn cannot commence earlier than the beginning of March—seldom so soon; and it must be over on the 10th of April; so that the shepherd has by far too little time to clear his ground of every useless or offensive production which may be generated on it for the last twelve months; not to speak of nuisances, which may have been accumulating on the surface for centuries, from which the soil has much need of being purified.* If heath, when fire is applied, is standing in a loose open state, the fire passeth swiftly over the surface, and leaves all the woody parts of the shrub unconsumed; but the heat shrivels the sap vessels to the very surface, and no farther, and directly where the capillary vessels cease to be collapsed, the young shoots protrude from the old stock, forming a fine sward of young heath, and by the branches of different roots intersecting each other, meets at top, covering over all the ground. This is juicy and sweet, and is eaten greedily by sheep about the month of September; and this burning has as yet been gone about rather in a random manner, often altogether neglected. But the husbandman doth not go over his arable land by a certain rotation of crops with greater exactness than a heathy pasture should be regularly laid out in heaths of different ages, the oldest spaces annually renewed by burning, when the next in seniority are in their last year. By this means this shrub is kept eatable through all the season, and even when other herbage is scarce in the spring months, a browse on young heath is far from being unacceptable. It is invariably said by the storemasters and shepherds, that heath is only valuable through the winter quarter; and I believe the disadvantages and neglect with which this production has been treated, has realized the general report. But how can it be of service when it is allowed to stand till it is useless? When old, it doth not vegetate till about the middle of June; but when young, its spring is little later than the softer grasses. In the former state there is scarcely a return of verdure through all the season. When young, it shoots more than an inch for several seasons, and at all times its germs are eagerly sought for, and eaten by the depasturing stock.

---

* These nuisances are the remains and exuviæ of reptiles, and the little less noxious parts of unwholesome herbage, which pollute the sward wherever they are decomposed, and a surface long smothered up by rank heath is very apt to engender both animal and vegetable corruption.

---

## ON GREENHOUSE PLANTS.—NO. II.

By Mr Towers, Author of the Domestic Gardener's Manual.

I perceive, on reviewing my last article upon this subject, that, were I to continue the botanical description of each individual *genus*, I should increase my papers to a very considerable extent; it therefore becomes desirable, in a degree, to alter the original plan. With reluctance I do this, because I am quite satisfied that no opportunity should be lost to facilitate the acquirement of botanical knowledge. However, I have said perhaps enough to point out to the inquiring reader the method by which plants ought to be investigated; and a moderate degree of attention and assiduity may suffice to place every real amateur of plants in the possession of a fund of sound physiological knowledge that will enoble his favourite pursuit, and render *that* a source of instruction which previously had been one of mere, though elegant, amusement.

The reader may perhaps retrace what I alluded to in my paper upon *Greenhouse Plants*, vol. v. p. 66, of a work then announced, entitled *Ladies' Botany*, from the pen of Dr Lindley. I said that "*I hailed this work*," and I find that I was quite correct in my opinion, which by anticipation I had formed of it. I have perused the "Ladies' Botany," and recommend it most seriously, not only to the ladies, and to mothers of families, but to all who wish to acquire an insight into the *natural system* of botany. That of Linnæus, I may, with justice, consider as most easy, as admirably calculated to direct the young student to the knowledge of *genera*; but it teaches by characters and distinctive marks, and, with some exceptions, is essentially *artificial*. The *natural system* is, on the contrary, one of pure *physiological* botany, and he who *knows* it must be a good and adroit vegetable anatomist.

Dr Lindley has executed a masterly deed, and his work redounds to his exalted honour. Though *I* am constrained to curtail *my* botanical descriptions, the reader will be no loser if he hasten to put himself in possession of this valuable work; and, in fact, a better teacher, one who knows his ground, and how to *lead* his pupil *on*, cannot be recommended. The learned writer is perhaps more averse from the Linnean system than the occasion requires; but he teaches so well, so clearly, and familiarly, that he ought to be read by all impartial inquirers.

I feel it my duty to add weight to my recommendation of this elegant as well as "*Familiar Introduction to the Study of the Natural System of Botany*," by laying before the reader an extract from one of the *Letters* (for the work is in letters, after the model of Rousseau); and I think that persons who are engaged in agricultural pursuits must be gratified, while the *ladies*, they to whom the work is peculiarly dedicated, will be delighted, by the easy address with which the author has cleared away the difficulties which have heretofore attended the investigation of one of the most abstruse branches of botanical science; I allude to the study of the natural order of the *Grasses*. This will be a digression, but one of great utility, and I feel confident that I shall be pardoned for calling in the assistance of so able, so scientific a coadjutor. Being myself constrained to abandon my intention of assisting the student in his or her studies, for the reasons assigned, I place before them *a work* which may supply every deficiency; and now, without further preface, refer to the work itself.

Letter xxii. page 252, is upon *Glumaceous plants*,—the *grass tribe*, &c. A well executed plate, with the parts of a plant dissected, arranged separately and numbered, is affixed to every description. I select the following passages, which will present a very fair example of the familiar style of the author. After a general description of the nature, quality, and uses of grasses, and alluding to those of foreign climates, comparing our short specimens with those gigantic productions of the tropics, where, as, for instance,—

> "In Brazil, we are told, that the hay will grow 7 or 8 feet high, the *sugar-cane plant* (Saccharum) averages 20 feet, and *bamboos*, with their light imperishable stems, lance up into the air to the height of 30 or 40 feet. It is in such regions alone that we can really behold the perfection of the grass-tribe:"—

He proceeds,

> "Let us, however, be contented with examining one of our own species, for a knowledge of this singular tribe."
>
> "One of the commonest of British grasses is the *soft bromegrass* (Bromus mollis), a plant which you will be almost certain to meet with in the first piece of waste ground. It is an annual, with an erect stem, about 2 or 3 feet high, and covered all over with soft hairs. The stem requires more than mere external examination. Strip off its leaves, so as to lay bare all its surfaces, and you will find it hard and thickened at every joint where a leaf has been torn. Split it, and instead of the solid centre of other plants, you will see that it is hollow, and consists of nothing but a cylindrical shell; at the joints, however, the sides of the cylinder meet, and form a firm partition, which completely separates one part of the stem from the other."

The structure of the *bamboo stem* is then described:

> "The leaves of brome-grass are hairy, narrow, and sharp-pointed at their lower end, which, notwithstanding its breadth, is considered to be their stalk: it rolls round the stem, forming a kind of sheath, which sometimes is not very easily unrolled. At the upper end of the sheath you may remark a thin white membrane, such as you have nowhere met with before; botanists call such a membrane a *Ligula*. Thus far we have two peculiarities in *grasses*, their hollow *round stems*, with *partitions* at the *joints*, and their *ligulate leaves*.
>
> "At the top of the stem of the brome-grass a number of slender branches appear, turned chiefly towards one side, and by their weight giving a somewhat nodding appearance to the parts they bear; those parts are oblong green bodies, apparently composed of scales after the manner of a leaf-bud; in reality they are little collections of flowers, whence they are named *spikelets* (or spiculæ, or locustæ, as they say in botanical Latin). Each spikelet is constructed as follows: Firstly, At its base are two green scales, each of which has about five ribs, these are the *Glumes*, strictly speaking; there is no trace of either

pistils or stamens in their bosom; on the contrary, they are always found to be perfectly empty. When the glumes are removed, you come to some other parts which at first sight look like glumes; but on a more careful inspection you will remark that they are composed of more scales than one, have a stiff bristle at their back, and contain some stamens, &c. at their bosom. These are called *Florets*; in the brome-grass there are about ten of them placed, one above the other, in two opposite rows. Each floret consists of two scales called *Paleæ*, of which the more external is the larger, is covered all over the outside with soft hairs, and bears at its back, a little below the end, a stiff bristle, called the *beard* or *awn* (arista); the beard is in reality the midrib or the palea, partially separated and lengthened out. The inner palea originates from above, and within the base of the outer, is much smaller and more membraneous, has its edges abruptly doubled inwards, and bears a row of stiff bristles on the angles formed by the doubling. These are the lower or outer, and upper or inner paleæ.

" Next the paleæ come, on the side next the outer paleæ, two exceedingly small scales, which are much shorter than the ovary, they are called *Hypogynous Scales*, and are supposed to be the rudiments of a calyx or corolla.

" From the base of the ovary arise three stamens, whose filaments are white, and so weak and slender, that the long narrow anthers hang in a state of oscillation, in consequence of the inability of the filaments to support them.

" The ovary is a wedge-shaped body, apparently consisting of nothing but pulp, and crowned by a tuft of long hairs, two styles, bearing singular brush-like stigmas, spring from its summit. In this instance you have all the parts that are usually present in grasses; and you cannot avoid remarking how widely different the whole organization is from any thing you have witnessed in other plants."

The author proceeds to dissect the seed-vessel or ovary, points out the embryo, the cotyledon, &c., and all in a style as inviting as it is perspicuous; but I cannot extend my extract. Suffice it to observe, that he has thus simplified, under the description of *scales*, all the complex machinery of grasses which used to bewilder the young botanist. I trust he will perfect his plan, and go through all the orders.—To quit digression, I shall, in the progress of these articles, content myself by arranging the subjects, selecting the most ornamental, and giving the reader an outline of their history and character, and the readiest mode of propagation.

We are now arrived at the third Linnean class, *Triandria*, which contains plants with three stamens. Its orders also are three, *Monogynia*, *Digynia*, and *Trigynia*. This order comprises most of the grasses proper; its members are insignificant, and the majority of the plants in it belong to the great natural class of *Monocotyledons*.

Commelina, of the natural order *Commelineæ*, is a genus with numerous species; two of these are beautiful, viz. *C. tuberosa*, tuberous-rooted Commelina, and *C. cœlestis*, sky-blue Commelina. The leaves are herbaceous, seated close to the stem; or rather, the foot-stalks of the leaves constitute the stem of the plant, as in Canna (see page 70. vol. v. of this Journal.) The flowers are blue, and emerge in constant succession from a peculiar semi-heart-shaped sheath, which also finally encloses the seeds. The plants attain the height of fifteen or eighteen inches; they die down to the root in the autumn, and then the roots may be preserved in sand, or in the mould in which the plant grew, provided no water be given, or so little as just to prevent dusty aridity. I have kept the roots of *C. tuberosa* during the winter in a pot with dry sand, in a cellar. As the spring advances, pot each root rather deeply in rich loam, adding one-third of river sand; water cautiously at the first, more freely as the growth advances. Plants may be raised from seeds sown thinly in February in a shallow pan, with drainage-holes at the bottom; pick out the young plants when they are an inch high, and place one in a small pot.

Commelina is stated to be a *stove plant*, but it will succeed perfectly in the greenhouse, and as is the case with most greenhouse herbaceous plants, it may be bedded out in the parterre during the summer; and even the seedlings will flower freely in the first year. "Bedding out" is one of the great improvements of modern horticulture, and while it renders the garden doubly ornamental, proves the great superiority of open ground culture, to that of confining plants in pots all the summer.

Commelina will not support frost; at least it will always be prudent to remove the finest roots to a place of shelter. *Commelina tuberosa* is figured in the *Bot. Rep.* No. 399; *C. cœlestis* in the *Bot. Mag.* No. 1695.

Ixia is the next genus to be considered; it is a wonderful family, and, with its congeners *Trichonema, Sparaxis, Tritonia, Babiana*), contain plants of singular beauty.

These five families belong to the natural order *Irideæ*, of which *Iris* is the type. All the Ixias are bulbous plants, and of easy culture, but gardeners differ in their mode of treatment. That which I have seen successfully adopted, is to remove the bulbs from their pots, after the flowering season, and the decay of the leaf; to shake off all the earth, and to plant them again in a mixture of pure loam and white siliceous sand, in nearly equal parts, though the loam, I think, should prevail; to plunge the pots into a bed or border facing the south-east, and placing a stratum of coal-ashes under the pots; then to cover the whole surface with a stratum of the same ashes, an inch deep; and, finally, to put a wooden frame and lights, or an awning of mats, over the space occupied by the pots. Dung or manure in any form is not added by some gardeners; others employ a fourth part of perfectly rotten dung with the loam. I propose the following mode of treatment:—About June begin to keep the pots of bulbs from much wet. In the autumn take out the roots, shake off all the old soil, separate the offsets, and plant four of the largest bulbs in a forty-eight size pot. The compost to consist of sandy loam two-thirds, peat or heath one-sixth, and two-year old leaf-mould, or sifted rotten dung, the remaining sixth; then place the pots in a cold frame during the torpid season, and bring the plants into the dwelling or greenhouse, when the leaves have pushed freely. The Ixia tribe ranked with *Ensiformes* of the old botanists, the leaves being supposed to resemble a sword or sabre. The leaves in general are long, wavy, strongly ribbed, and of a sea-green colour. The flowers are of all hues, are produced in a spike or rank, one above the other, the lowest opening first. They are large and conspicuous, larger generally than a crocus, and some have a beautiful transparency at the base of each petal. It would be needless to enumerate all the members of the family.

*Ixia leucantha* has white large flowers.

*Ixia aulica* is rose-coloured.—*Bot. Mag.* 1013.

*Sparaxis tricolor*, formerly *Ixia tricolor*, has petals of three colours, yellow, dark brown, and orange. It is a splendid species. There are three or four beautiful varieties.—*Bot. Mag.* 381.

*Sparaxis versicolor*, party-coloured Ixia.—*Sweet's Flower Garden*, 160.

*Sparaxis grandiflora*, with purple flowers.—*Bot. Mag.* 541.

*Tritonia crocata*, saffron-coloured Ixia, has the base of each segment of the corolla nearly as transparent as glass.—*Bot. Mag.* 184.

*Watsonia rosea* is a fine large plant, with a pyramidal spike of purple or rose-colour blossoms; taller than most of the family; for few of the members of it are above from eight and ten inches to a foot. This is above eighteen inches.—*Bot. Mag.* 1072.

*Babiana rubro-cyanea* is a low grower, but has beautiful blue and red flowers.—*Bot. Mag.* 410.

All the species are eminent ornaments of the greenhouse, and should always be protected under glass, be somewhat shaded, and freely watered during the season of flower. It is not, however, unusual to plunge the pots of the saffron-coloured Ixia below their rims in the "bedding out" order, and in May and June its gorgeous glittering flowers, with their transparent glassy bases, seen in mass, in the full splendour of the sun, produce a very striking effect.

Gladiolus.—The name of this showy family is derived from *gladius*, a sword, the leaves having some resemblance to the Roman weapon of that name. There are upwards of thirty cultivated species, most of which, in common with the more tender Ixias, are natives of the Cape of Good Hope. They all may be treated alike; that is, all should be potted in very sandy loam, with or without leaf and peat mould, and be preserved from wet during the season of repose. *Gladioli* may be kept in the greenhouse while in flower, or in the sitting-room or under a frame. Everywhere they are beautifully ornamental. I name three species only, but twelve or more may decorate large collections.

*Gladiolus cardinalis*.—The specific title expresses its prevailing red tint. The flower appears in July, is large, conspicuous, two or three inches wide, and produced in a spike about two feet high; the red is relieved by stripes of white upon the three inferior segments of the flower. This species is occasionally bedded out in masses.—*Bot. Mag.* 135.

*Gladiolus floribundus*, or large-flowered corn-flag, is shorter in growth, of a fine citron-yellow, the flowers pretty regular in shape, but the upper segments narrower than the other. May. —*Bot. Mag*. 610.

*Gladiolus pudibundus; blush-coloured.*—This is a most beautiful species, described in Sweet's Flower Garden, and supposed to have been bred between *G. cardinalis* and *G. floribundus.* It is large, the flower rather unequal, the general tint rose-colour or approaching to purple, relieved by three spots of crimson and yellow on the upper segments.—*Hort. Regis.* vol. ii. 305.

Antholyza, a term said to be formed of two Greek words (*anthos*, a flower, and *lyssa*, rage,) which denote a gaping, expanded mouth, as of an animal in a rage; but I might perhaps hazard the conjecture, that the word *anthos*, and *lusis*, or *lysis*, (a loosening or dissolution), would be more relevant, as implying the loose irregular structure of the flower, the upper lip of which is raised and arched widely above the lower one, which is bent downward, and cut into several segments.

*Antholyza Æthiopica*, the Ethiopian Antholyza, is scarlet, variegated with green or yellow; blows in May.—*Bot. Mag*. 561.

*Antholyza vittigera*, the striped or ribband Antholyza, of an orange colour. January or February.—*Bot. Mag*. 1172.

Both are of easy culture, and may be treated as the before mentioned *Irideæ.* They grow to the height of two or three feet. They are natives of the Cape, introduced in 1759.

Moræa.—This is a genus of *Irideæ*, which, in structure, approaches to that of the true Iris, or fleur-de-lis. The roots are bulbous, the leaves long and wavy; some are ciliated or edged with delicate hairs. There are above twenty species, of various colours, blue, yellow, purple, growing from six inches to two or three feet high. Sandy loam is suitable to the whole of them.

*Moræa collina** has purple flowers, more regular in their structure than most of the family.—*Bot. Mag*. 1033.

*Moræa pavonia* is a beautiful species. The plant attains a foot or more in height, and bears red and blue flowers.—*Bot. Mag*. 1247.

*Moræa ciliata* is a dwarf, with elegantly fringed wavy leaves, and terminal Iris-like purple flowers.—*Bot. Mag*. 1061.

---

* *Moræa collina* has recently been removed from the genus and class, in consequence of the position of the stamina and the character of the flowers. Its name is now *Homeria collina*, Class 16, Ord. 1. *Monadelphia Triandria.*

This family is a native of the Cape, and its species were generally introduced in the latter period of the eighteenth century.

MARICA is another elegant family, but its flowers are fugacious; it is Iris-shaped, irregular, of six petals, three larger and three smaller.

*Marica cœrulea* has large blue flowers. It is a native of Brazil, introduced in 1818, and may be grown in rich border loam.—*Bot. Reg.* 713; also in Paxton's new Mag. p. 128[*].

All the plants of the families of *Iridea* which have been mentioned, flower in the spring, or early in the summer. They may be readily increased by offsets from the roots, when they are repotted in autumn.

SISYRINCHIUM, the name derived from two Greek words, which signify the snout of a boar. This is also a genus of *Iridea*, but the roots are herbaceous, not bulbous. It may be increased by dividing the roots after the plants have passed the flowering season, and are dormant. The species are about fifteen in number, perhaps more, as several new ones have recently been introduced from South America. They are not tall growers, rarely exceeding twelve inches in height. The flowers are blue, yellow, and white. The plants are natives chiefly of the continent of America, north and south. A light sandy soil, or sand and peaty heath, are most suitable to them.

The remaining plants of the first order are, with few exceptions, *grasses*; the second order, *Digynia*, is exclusively devoted to that most essential tribe of plants; and the third order, *Trigynia*, does not contain one greenhouse plant of interest.

In the fourth Linnean class, *Tetrandria*, the genera have four stamina. The orders are three, *Monogynia* having rather more than one hundred *genera; Digynia*, at present has in it four *genera* only; and in *Trigynia*, ten genera are described.

---

[*] In Aichat's work it is treated as a stove plant, and has continued in flower for six weeks or more. It is fragrant.

*Paxton's Magazine of Botany* is a new and elegant work. It is executed under the immediate superintendence of the author, contains four plates, with descriptions; and the modes of culture are "*given from his own daily experience and observation.*" Besides the usual botanical illustrations, the work contains abundance of truly useful matter, which ought to bring it into general repute. It is a capital compendium of botany and horticulture.

When I thus mention occasionally the number of families and species, I do not pretend to rigid precision. Plants are introduced continually, and *new* genera are sometimes formed. Hence I can only be answerable for an approximation to the real numbers, as I trace them in the latest edition of the *Hortus Britannicus*, allowing even a trifling latitude for the interposition of recent additions. Before I proceed with my selection, I feel that it is due to the inquiring and practical reader to make a few remarks upon soils. I find that I become acquainted with fresh and interesting facts by every day's experience and observation; and, therefore, am satisfied, that many errors may be avoided, and disappointments obviated, by the knowledge of, and attention to, a few plain rules.

Nurserymen are much more simple in their practice than many imagine them to be, from the papers and directions in horticultural works. They grow most of their finest plants, and preserve them in perfect verdure and health, by the means of two sorts of soil only; but their experience has taught them to apportion those soils according to the habits of the plant. *Loam* and *bog-earth* are terms that have been familiar in the gardens for more than half a century; and although many may introduce perfectly rotten manure, river sand, and so forth, it is for want of the means of procuring an efficient supply of those two staples of the nursery, and not because of any improvement in practice.

Of *loam* I perhaps may have said enough in my first paper, p. 807, vol. v. I have there also attempted to afford a substitute for bog-earth. Of loam, then, I shall only remark, that *earth from couch-grass roots*, produced upon a moderately firm and binding soil, will become a chemically true loam, perhaps equal to that which was much celebrated about thirty years ago, when I first attended to plant-culture in the neighbourhood of London. *Hampstead loam* was fetched far and near at, I believe, a guinea for a two-horse load: it was of a pale, buff-brown, adhesive to a certain point, but friable; hence its largest constituent was fine silex; the iron it contained was not fully oxidated, as in the dark ochry red loams of many counties. *Bog-earth*, as it was then styled, is now known by the term *peat;* which word is purely conventional, as the last named substance is in fact a cold wet mass from turbaries (turfs), unfit for vegetation till it be meliorated by time and exposure. *Heath-mould* is the soil that nurserymen intend to express by the terms *bog* and *peat.* It is an admixture of black vegetable matter, with a very great excess of pure siliceous (*silver*) sand. No one who had not tested this black substance by fire could conceive the proportion of white sand which really exists in a mixture of a colour so diametrically the reverse: from 120 grains I obtained 100 grains of pure white sand. There is, however, another sort of heath-mould more approaching to peat, and this is often procured from woods and thickets. It is of a deep brown colour, close in texture, and with far less sand, and evidently has been formed chiefly by the progressive decay of leaves and small wood. Where this species alone can be procured, half, or one-third, of its weight of fine washed sand may be added to it, for heaths and most of the tribe of hard wooded fibrous-rooted plants.

By the term of *peat-earth* or *peat*, I mean to express that sort of soil wherein heath is found to flourish well. If it be manifestly too replete with sand, very old leaf soil will meliorate it; if it appear of a full greyish-black, interspersed with numerous particles of shining white sand, the quality will be favourable, particularly if, when moist and fresh, it adhere well together, and be full of fine fibres.

For heaths, kalmias, rhododendrons, and azaleas, such soil, without any mixture, is most appropriate. For other plants with more succulent and cellular roots, mixtures of loam and peat are directed. Equal parts of both are intended whenever the words *loam and peat* are employed, without expression of quantity or proportion; the same may be said of sand and loam, where definite quantity is not mentioned. In all cases soils should be chopped up, or rubbed with the hands, never sifted. If sticks in decay, half-mouldered leaves or fibres, remain, let half an inch of these be placed for drainage at the bottom of every pot. A nutritive mass of decaying matter will then be there, and redundant water will escape almost as easily as through bits of tile, stone, or cinders.

The above remarks will, I hope, be considered applicable, and in place.

Among the most striking of the plants of the fourth class, *Tetrandria*, are those which are found in the natural order *Proteaceæ*,—a term which is derived from *Proteus*, and intended to denote the supposed variableness of their form, or general habit. They are all plants of interest and curiosity, very singular in their structure and inflorescence, but not more changeable than many others. The several genera are, *Petrophila* (petros, a stone), found in rocky situations in New Holland. *Isopogon*, that is, equally bearded, the hairy appearance. *Protea*, the type of the order, comprising at least fifty species, natives of the Cape of Good Hope. *Leucospermum* (from the *whiteness* of its seeds). *Mimetes. Serruria. Nivenia. Sorocephalus*, from the heads of flowers being in *heaps* or masses, but they do not appear to be peculiarly so: in this sense most of the *Proteacea* might be termed *sorocephali. Spatalla, Adenanthos, Cenospermum, Grevillea*, and *Hakea*, contain many species worthy of the attention of great collectors; but *Banksia* and *Dryandra* are perhaps in more request.

Six or eight specimens of *Proteaceæ* ought to be found in good though small collections; these, perhaps, ought to be selected from *Protea* and *Banksia*. Of the former, as they grow to a moderate height (1, 2, or 3 feet), and are handsome plants, I mention—

*Protea cynaroides*—Head resembling that of an artichoke; is short; the leaves have long stalks, broader at the upper part, and roundish; the flowers of a *pink* hue.—*Bot. Mag.* 770.

*Protea speciosa*, showy or splendid Protea—*Purple flowers*, with oval leaves, narrower at the base; height about 2 feet. The flowers of these, and of most of the species, are in a head, which terminates the branches; hence all are called terminal flowers.—*Bot. Rep.* 110.

*Protea acerosa*, sharp-pointed or pine-leaved Protea.—*Id.* 577. The flowers are not terminal, but in a sort of cluster near the end of the branches, under a head or tuft of fine awl-shaped delicate leaves.

Persons who have never seen any of these singular tribes of plants, may form some idea of their inflorescence generally, by imagining a head at the termination of the stem or stems, resembling, in a degree, the cone of a cedar, with scales (*bracteæ*), but more expanded at the top. An artichoke may perhaps furnish a closer resemblance, as the flowers which appear above the imbricated bracteæ may represent those of Protea and its congeners: the flowers vary in colour from green to brown, pale pink or whitish to a full purple; they are all collected in heads; are small, and numerous, and succeeded by a roundish seed or nut. Many species do not readily produce flowers in Britain, but others, of taller growth, form beautiful shrubs in the open beds of the conservatory; such are—

*Protea latifolia*, the broad-leaved scarlet-flowered (7 feet).—*Bot. Mag.* 1717.

*Protea coccinea*, or scarlet (5 or 6 feet).

*Protea neriifolia*, oleander-leaved (6 feet).—*Bot. Reg.* 208.

*Telopea speciosissima* is, as its name implies, a most splendid conservatory plant, of 10 feet growth, with red flowers, and ovate, or wedge-shaped, serrated (*i. e.* cut like the teeth of a saw).—*Bot. Mag.* 1128.

*Banksia* contains about thirty fine plants, most of which are appropriate to the conservatory. The greater number has been introduced within the period of thirty years.

*Banksia speciosa* is beautiful and singular in its foliage, which is linear, or narrow and long, of an equal breadth, toothed, or cut like the teeth of a large broken-pointed saw; the angles of one side alternating with those of the other. It does not appear to have flowered in England.

*Banksia nutans*,—with nodding flowers, silky yellowish; the leaves sharp-pointed, like a needle. Not figured.

*Dryandra floribunda*.—Grows 3 feet high, has yellow flowers, produced in a head resembling a thistle; the leaves large, serrate, the teeth sharp; the head of flowers is seated in a whorl of these fine leaves.—*Bot. Mag.* 1581.

*Dryandra nivea*.—Snowy or white-leaved, 1 foot in heigh the leaves are serrated, and much resemble those of *Banksi speciosa*, but are white beneath; flowers yellow, in a more loo or open head. July to September.

The culture of *Proteaceæ* is somewhat difficult; at least a matter of nicety. The plants may be raised from seeds, but preferably by cuttings of young but ripened wood, under a glass. Sweet directs sand—that is, pure silver sand—to strike in; but I always think it best to fill the pots with the proper soil, which, for these families, should be sandy, turfy loam, rotted and chopped small, with a third part of sand; or a sandy heath mould. Let each pot be well drained with potsherds; then, with a round stick, press a hole down to these sherds; pour in a very little silver sand, then place the cutting in the hole, so as to touch the drainage; fill the hole with the sand, and give a little water to fix the cutting. The hole need not be above double the diameter of the cutting, and that being surrounded by sand, its roots can be excited, and yet be able to push at once into their proper bed; a little heat will be required to strike the cuttings. In every stage of growth *Proteaceæ* require a steady and equable moisture of soil, but no excess of water.

*Bouvardia triphylla* (formerly *Houstonia coccinea*) is a beautiful deciduous shrub, or, more properly, herbaceous plant, with a rather woody stem. It belongs to the natural order *Rubiaceæ*, has lance-shaped leaves, in threes (*ternate*), up the stems, and a cluster of long scarlet flowers, with spreading tips at their extremities. These somewhat resemble the trumpet scarlet-honeysuckle. The variety "*pubescens*" is figured in *Bot. Reg.* 107.

There are two varieties of this species, one redder than the other. Both remain dormant during winter, and should then be kept under the stand of the greenhouse with very little water. Early in the spring the plants should be shifted into rather small pots, and at that time may be multiplied by cuttings of the roots, retaining a portion of stem, with two or three eyes. The soil should be light and rich. When the buds break, water must be given moderately; and when the warm weather is finally set in, the plants may be bedded out in the parterre, where they flower finely; and, if in considerable numbers, the effect produced is very striking. As the winter approaches, repot the plants.

*Bouvardia versicolor.*— Various-coloured Bouvardia (*Bot. Reg.* 245) is a tender plant, introduced from South America in 1814. Flowers red, longer, declining; leaves opposite, and in pairs. Both the species grow 2 feet high; the first higher when bedded out, if it take the soil, which ought to be a light vegetable earth, blended with a considerable portion of sand. Sandy peat and decayed leaves, sifted, in equal parts, will do well for pot culture. They blow from April to October.

---

## OBSERVATIONS AND EXPERIMENTS PROVING THE PARR OR BRANDLING TO BE THE YOUNG OF A VARIETY OF THE SALMON.

By Mr John S. Milton, Surgeon.
Communicated by Dr Knox.

After the numerous interesting papers which have been communicated to learned societies on a subject apparently involved in such hopeless obscurity as the natural history of the salmon, I must, in excuse for venturing to enter upon this subject, assure my readers that I shall not venture to occupy their time by adducing any theories or particular views, but simply by endeavouring to submit to their consideration the conclusive results of some experiments which demonstrably prove the *parr* or *brandling*, to be the young of a variety of the salmon.

Individuals acquainted with the rivers of this country, have long been aware that many varieties of the salmon exist in these waters, such as the *Salmo salar*, or common salmon of the market; the *grilse*, the *sea-trout*;—and, about their mouths, the *whitling*, and the *yellow fin*,—some of which are presumed to be the fry in an advanced state of growth, as the *yellow fin* and *grilse*; and others, as the *sea-trout* and *whitling*, are known to be found with milt and roe, in a condition for spawning, and supposed to be distinct varieties of the genus.

Of the young or fry of all these, we know little farther than that, at a certain period, and for a short time, vast numbers of small fish, of similar aspect, and passing under the designation of *smelt* or *smoult*, are found in the streams where the various species of salmon have spawned, and under those names are protected from destruction by the authority of the legislature. But in consequence of scientific persons having been unable to prove that the shoals of small fish called *brandlings* or *parrs*, are the spawn of the salmon genus, no protection is provided for them in our act, and millions are annually destroyed by the anglers alone in their sport.

The consequence is, a yearly decrease in the supply of salmon, naturally induced many persons connected with the fisheries, to attribute the failures to the destruction of the spawn; and Mr Peat, the farmer of the Earl of Lonsdale's fisheries, on the Derwent, instituted some experiments on the *parr*, which are now offered to public consideration, under the assurance that, if the members of our learned societies consider them of the importance they seem to possess, they will give the subject their deliberation, as to the readiest means of remedying the evil of the destruction of the spawn of a fish, which was once the food of the peasant, and can now scarcely be purchased in many places by the rich.

Mr Peat had long been in the habit of performing a number of experiments, something similar to those made by Mr Hogg, on the parr of the Yarrow, and had invariably arrived at the conclusions that this little fish became larger, descended to the sea, and returned, in process of time, of considerable weight, size, and of excellent flavour, when it was sold as a salmon in the markets he supplied.

A gentleman residing at Workington, who derided these assertions, captured some *parr*, and deposited them in a pond in Mr Salheld's tan-yard. Nearly twelve months passed over, and these fish, when taken out, were found to be entirely altered, having attained a considerable size, assumed the scaly appearance of the smelt, and bearing the evident marks of growing, though diseased fish. Not satisfied, however, with the result of this experiment, which he conceived might not have been properly superintended, he repeated it; and, in the presence of witnesses, with the same conclusion,—these *parrs* shewing the appearances, from their great length, narrow shoulders, and large eyes, of creatures during the process of their growth. Of course, nothing is easier than to raise objections to the results of this inquiry, by doubting the individual's knowledge of the characteristic and distinguishing marks of the fish he confined; but although it must be acknowledged that many of the trials have been inconclusive, from the ignorance of the persons superintending them; yet I am fully satisfied, from the unwearying researches I made through Cumberland, that I have not one iota of speculation to advance, or one circumstance to relate, that cannot be substantiated by persons of undoubted veracity, and men who have fished the waters during a long life.

Instigated by the happy result of this trial of his friends, Mr Peat, in conjunction with William aud Joseph Dickinson, Esquires, surgeons, of Workington, placed a number of the impregnated ova of the salmon in tumbler-glasses, and succeeded in bringing to life three different breeds in different temperatures. Two were lost from incautious treatment, but the other breed, consisting of three fœtal fishes, lived during nearly three weeks attached to the ova by the umbilical cords, on the separation of which they expired, for want of their natural food. One of these animals attained the length of an inch, displayed the characteristic marks of the *parr*, and sported and played in his element with astonishing vigour and strength.

The relation of these circumstances to me by Mr Peat, induced me not only to make them known to the public, but also to collect a considerable mass of corroborative evidence from other sources, and to pursue some anatomical inquiries on the *brandling* or *parr*, which were all equally conclusive of its growing to be a salmon of a species which I shall endeavour presently to point out.

A curious and interesting accidental occurrence furnished a gentleman, Mr Harris, of the Goat, near Cockermouth, with an opportunity of placing it beyond dispute, that the *brandling* or *parr* is hatched from the ovum of the salmo. On digging into some sand-beds in the Derwent, during the latter part of a dry summer, that gentleman found, near the surface, innumerable *parr* lying dead, and varying in size from two to three or four inches. On proceeding farther down, he discovered to his surprise the *parr* of smaller size attached to such large ova as must have belonged to a salmon or large salt water fish alive, although in gravel only just moist. The deeper he dug the less the fish became; and, at the depth of a yard, he found thousands of the impregnated ova, in all stages of progression towards the fœtus, being hatched. In some only the eyes were visible; in others the eyes and the spinal column, coiled up in the egg; and, in many, the diminutive creature attached to it by the cord.

Some of the largest of these attached to the ova, and some of hose separated from it, Mr Harris collected, placed in a washng-tub, and kept alive for several weeks. They presented to the most careless observer, the lateral bars or *finger-marks* of the *parr;* and, out of the many persons who resorted to see them, no one ever pretended to dispute that they were the fish so abundant in that river, under the name of *brandling*, and so plentiful in the salmon rivers of Scotland as the *parr*.

As these sand-beds have always been a celebrated resort of the salmon for spawning during the winter months, when they are covered with water, Mr Harris was induced to repeat his researches; and, singular to relate, discovered precisely the same results; and I hesitate not to say, that, with the sanction of any of the learned societies, specimens can next summer be forwarded of the fish in all their different stages of growth, from the ova deposited at the bottom of the spawning grounds of the salmon, to the brandlings lying dead during a dry summer on the surface. With the first autumnal flood, those which have not been destroyed free themselves from the ova; and I myself have caught the *parr* during November in this river, little more than one inch in length. Of course, a circumstance of this kind, supported as it can be by incontrovertible evidence, is sufficient to determine that the *parr* is the young of a large fish, of the salmo genus; and I should not consider it necessary to advance any further evidence, but that the following circumstance may, in some measure, shew how slowly a fish in confinement, and deprived of its liberty to migrate and feed according to its natural laws, must necessarily grow.

Mr Peel of Stanger, a gentleman well acquainted with every description of fresh-water fish, had some years ago an excellent opportunity afforded him of remarking the changing of the *parr* to the salmon. Having prepared a number of *parr* out of the river Cocker, in the month of June, long after the smelts had descended to the sea, and being prevented from using them for pike baits, as he had intended, he placed them in a gutter of one of his fields, in a situation from which they could not escape, where for a long time they were entirely forgotten. At the expiry of two years and one month, while engaged in his fields, Mr Peel was attracted to this gutter by a splashing sound—remembered his *parr*—and to his astonishment discovered that they had grown to be long, lean, scaly fish, much of the appearance of the *parrs* as described above, and most of them suffering under disease of the gills. Mr Peel had always maintained the common prejudice of his countrymen, that a *parr* or brandling was born a brandling, lived a brandling, and died a brandling; and of course was considerably astonished at seeing all his views so completely upset, being so thoroughly satisfied that the brandling increased in size, and became a large fish, although of what precise variety of the salmon unable to determine.

Mr Bowman of Carlisle, and Mr Bird, the proprietor of the Kirkoswald Fisheries, performed experiments on the parr, which led to exactly similar results; and the Rev. Mr Wybergh of Isell Vicarage, who had always maintained very opposite views, had lately reason to acknowledge the certainty of the change occurring in the *parr* to a larger fish, by observing it on some which were accidentally washed into his fish-pond, and retained there for a considerable time.

I could advance many more instances of a similar kind, where individuals have had the truth forced upon their notice by accidents and circumstances, the importance of which it was impossible to deny. But as I feel assured I have simply related a few facts proving the *parr* to be the young of a larger fish, which cannot be denied, I shall endeavour to shew that it is the young of a variety of the salmon frequenting our streams.

In the first place, negative evidence acquaints us with the curious facts, that *parr* are never to be found in rivers unfrequented by salmon; and, although Dr Knox has proved that they do not now exist in the Whitadder, where *some* species of salmon abound, they yet always may be discovered in the waters inhabited by *all* our varieties of the salmon.

An excellent example of this occurs in the Derwent and the Ellen, two rivers of Cumberland, both discharging their waters into the Solway, within five miles of each other. In the Derwent, every variety of the salmo abounds; and there the parr is found in innumerable shoals. But in the Ellen, where only the square-tailed fish, commonly called the sea trout, locates, [illegible] individual ever beheld a *parr*, although, in the spring, the smelt of this sea-trout is plentifully caught.

I am aware that it has been asserted in a note in this Journal, on Mr Hogg's paper [*], that, somewhere in the Western Isles, *parr* are found, and not salmon; yet I beg to submit to consideration, that these streams may have been very partially examined, and that they may assimilate to some of the small rivers which I have fished in Yorkshire; where, owing to the minuteness of the stream, the salmon frequently only make their way a short distance up from the coast, deposite their roe, and disappear immediately; and in these streams, at a great distance up towards their insignificant sources, I have caught abundance of *parr* [†].

From attentive consideration to these points, and from all the information I could ever collect on the subject, I am disposed to believe that, wherever all the varieties of the salmo genus abound in any one river, we shall there certainly have the *parr*; and I hesitate not to challenge a refutation of this assertion, by clearly defined and substantiated proofs. If this be admitted, then we arrive at the conclusion, that the *parr* is, in some measure, connected with the salmon, and, as I have proved, the young of one of its varieties; and it only remains to determine to which species it belongs.

In the second place, the positive evidence of most of the experiments which have hitherto been performed upon the *parr*, prove that it becomes a larger fish, descends to the sea, and returns, after a certain period, of various sizes and appearances.

Mr Hogg, it will be remembered, in the paper alluded to above, marked a number of small fish, which, at the moment of taking them, he considered *parr*, and informs us that many of them were subsequently caught in the Tweed and Yarrow, some as sea-trout, and others as salmon. This inconclusive evidence, however, is by no means original with that gentleman.

The grandfather of the present proprietor of the Derwent Fisheries, so long ago as the memorable year 1745, commenced marking the brandlings and smelts occasionally caught about his fisheries; and ever since that period, first his son and then his grandson, continued to mark them, by removing the dead fin, back-halving and fore-halving the tail, and invariably succeeded in having some of them, at subsequent periods, for sale on their fish-stalls, when arrived at a considerable size, and weighing about 20 lb.

---

[*] Vol. iii. p. 449.

[†] I never thought that *parr* had been observed near the *sources* of rivers.—Dr Knox.

Such results, however, led to very little knowledge of the disputed points; for I must observe, that, while Mr Hogg and others call the fork-tailed fish the salmon of the Tweed, Mr Peat declares the square-tailed fish to be the real salmon of the Derwent, and shewed me a drawing of one upwards of 70 lb. weight. The gilse or grilse of Cumberland is fork-tailed—the *sea-trout* square-tailed, but seldom reaching a weight of 12 lb.; whereas I myself lately forwarded to Dr Knox the vertebral column of a salmon of 25 lb. weight, in which the tail was as square as if formed by a rule.

While such differences of opinion as these exist, I cannot pretend to offer an assertion as to the *name* of the exact species of salmon which the *parr* becomes; nor, as long as the experiments on the fish continue to be performed in such an unsatisfactory manner as removing the dead fin, or back-halving the tail, can any thing be defined of the period of the growth and the habits of the fish; for while one person is marking a fish for scientific researches, perhaps another is wantonly inflicting the same memento on two or three dozen varieties of spawn; which I have done during many a summer day, and which I have heard old fishermen remark they have been in the habit of doing on the Derwent for upwards of fifty years. There is a circumstance related, with all the gravity of truth, in the Encyclopædia Londinensis, which has only to be read to convince the most credulous how ridiculous it is to rely implicitly, without examination, on whatever is advanced. A Frenchman is there stated to have placed rings of gold or silver wire through the tails of smelts, which proved so accommodating as to return at the exact time, for enabling the enthusiastic Frenchman to determine that the smelt required six years to become a salmon, during which term e inflicted on the young fish such names as *morts* and *sprods*, *yellow-fins* and *whitings*,—not at all aware that, in many parts of England, the *morts* and *sprods* mean, and had meant for ages, *yellow fins* and *whitings* themselves!

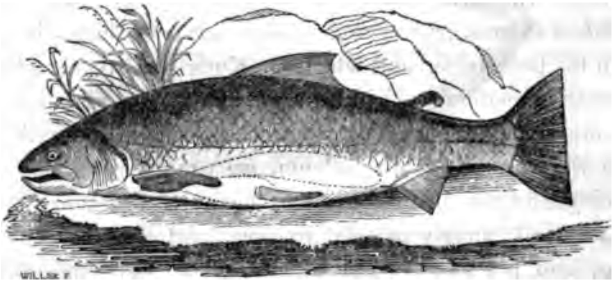
Under all these difficulties, I resorted to dissections of the fishes, with the impression that the deep anatomy could certainly furnish me with some conclusive results; and I have had the proud satisfaction to discover that my surmises were not altogether incorrect.

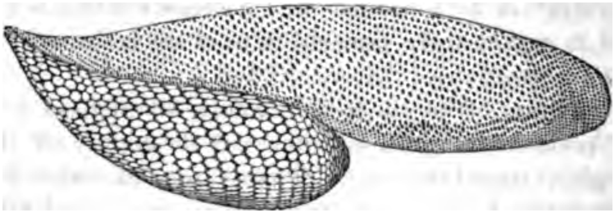
It is certainly true, that naturalists have already presented us with *an* anatomy of the Salmon; and have very minutely described the various organs of the fish. But, I think, when we remember that in the Encyclopædia Londinensis, which contains a pretty faithful summary of the conclusions of the principal naturalists who have written on this fish, it is there asserted that the *Salmo salaris*, or common salmon, has only thirty-six vertebræ in his back bone, and when Dr Knox and others, who, as comparative anatomists, will bear me out in the assertion, that there are sixty vertebræ, instead of thirty-six, in the back bone of all the varieties of the salmon, we cannot place any very implicit confidence in the assertions hazarded by these persons, who, after all, merely pretend to give a detail of parts as they appear, and not to draw any conclusions or classifications from the structure of the fish, which we are certainly generally accustomed to regard as the principal value of the comparative anatomist's research.

The number of rays in the fins, considered by these naturalists likewise of so much importance, I do not myself attach the slightest regard to, as some of them are so cartilaginous and indistinct, that I am not sure if any two persons can number the same; and in the infant fish, of course, it is impossible to count them; and even when we can, there appears nothing, structural or numerical, to characterize them from those of many other fish, and all the varieties of their own kind.

Accordingly, I looked to the feeding of the animals, and the structure of their generative organs, to afford me some clue; and on proceeding with my examinations, I was astonished to find, that while the stomachs of the square and fork-tailed salmon, called in Cumberland, salmon and gilse, were invariably apparently empty, the stomach of the sea-trout was just as constantly stuffed with flies, worms, and other particles of common and gross food, which induced me to set it aside as a coarse feeding variety. But the remarkable similarity of habit, in the feeding of the others, led me to examine minutely the structure of the fork-tailed salmon (the gilse), and of the square-tailed or common salmon, expecting to find their deep anatomy precisely the same, although the superficial anatomy displayed the broad difference of the fork and square tail; but, to my great astonishment, I found a marked and perfect distinction in the generative organs, where I looked for them agreeing in every respect.

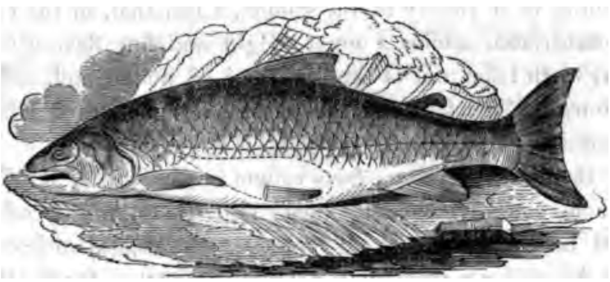
In the square-tailed salmon I found two beds of roe of *unequal length* lying *one below another*, as represented in this figure, sketched from a fish of 25 lbs, and containing ova of *un-*

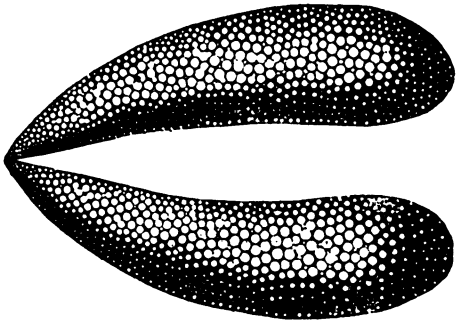




*equal magnitude*, the short bed being only one-half the length of the long one, but containing an egg of double the size. On inquiring of Mr Peat, who had been accustomed to open thousands of fish, he told me that the beds of roe *invariably* differed in size, and lay one below the other in the salmon, but that at a certain period of gestation, the ova became *more nearly equal in their bulk.*

In the generative organs of the fork-tailed salmon, precisely the reverse of this order is displayed. There two beds of roe are found of *equal length*, and lying *parallel to each other*, as represented in this figure.





Of course, I immediately procured and dissected a number of *parr*, and there I found exactly what I expected, that this little fish, which in its superficial anatomy precisely resembles the fork-tailed salmon, resembled it as closely in the structure of its generative organs, having the two roes lying in equal and parallel beds. The roe is rudimentary, and the ova must be seen through a magnifying lens at certain seasons; but during the autumnal months, the beds have arrived at such a growth, that the ova may most distinctly be seen and counted with the unaided eye, and in this advanced condition I presented some to Dr Knox a short time ago.

These, I think, it must be allowed, are essential and marked features in the anatomy of an animal, which are too momentous to be lightly thrown aside. I consider that every known circumstance of the habits of the *parr* proves it to be the young of a migratory fish like the salmon; and I see in the anatomy the most pointed dissimilarity from every fish in the river but one, and to that I find it approximate so closely, or rather resemble so precisely, that I must now venture to pronounce it to be the young of a variety of the salmon, a fish that, in the rivers of Cumberland, attains a great weight and fine flavour; and which, when taken out of the Tweed, is, I understand, sold in Edinburgh Market, under the general designation of salmon, and considered the finest description of fish.

If, then, these curious facts cannot be disproved, it will no longer be considered extraordinary that the supply of salmon should have decreased from rivers, in the neighbourhood of which no adequate increase of population accounts for the difference. On the Derwent, there cannot now be taken a tithe of the fish formerly caught. But it is an ascertained fact, that the brandling or *parr* is, as the salmon decreased, not only more closely sought after by the angler, but more fearfully devastated by the poacher with his nets.

If, however, this fish were preserved by the authority of the Legislature, and the privileges of the angler in a compensatory degree enlarged, the results would in every probability be satisfactory in the extreme. Learned societies can, either by a recognition of the truth of these statements, determine the *parr* to be the young of a variety of the salmon, and by so doing, shew the importance of the inquiry to the Legislature of this country; or by instituting a series of experiments, which I can assure them may be performed at a very trifling expense, possess the means of placing the matter for ever beyond dispute.

---

## ON THE CULTURE OF THE DAHLIA.

By James Heriot, Esq. of Ramornie.

The Dahlia is a native of Mexico, from whence it was first introduced into Spain, and from thence it has gradually spread itself over Europe. It was first brought to Madrid in the year 1789, and was introduced into England the same year by the Marchioness of Bute, where it was lost from not understanding its culture, but was again raised there in 1804 from seeds obtained by Lady Holland. The *Dahlia frustranea* or Barren-Rayed Dahlia, is said to have been introduced into England by Mr John Fraser in the year 1802.

The dahlia first appeared in France about the year 1800, where it has been cultivated with much success. T root was used in Paris as an esculent, but its taste and flavour have caused it to be rejected both by men and animals, although it is said to be occasionally sold in Covent Garden market instead of the Jerusalem artichoke, which the tuberous roots in appearance somewhat resemble. It is therefore solely, or at least principally, as an ornament to the flower garden, which, in this country, it beautifies from the period of its coming into flower, in the beginning or middle of July, until the month of October or November, when it is destroyed by the frost, that it is so much cultivated.

The dahlia, or Georgina, as it is called by the botanists on the continent, belongs to the class *Syngenesia* of Linnæus, and the natural order *Corymbiferæ* of Jussieu, and to the orders *Superflua* and *Frustranea* of the former botanist, of the former of which the common ragweed (*Senecio Jacobæa*, Lin.), and of the latter the common corn blue-bottle (*Centaurea Cyanus*, Lin.), afford an illustration. The genus is thus described: " Receptacle chaffy. Pappus none. Calyx double, the outer polyphyllous (many leaved), the interior monophyllous (one-leaved), divided into eight divisions *."

Botanists have separated the dahlia into two divisions, as they belong to the order *Superflua* (fertile rayed) or *Frustranea* (barren rayed), as above mentioned, which are thus botanically described: " *Dahlia superflua* (fertile rayed dahlia), having the stem not hoary (*non-pruinosus*) and the straps (*ligulæ*) female." Loudon thus describes this order: " Rachis of the leaves winged, leaflets ovate-acuminate, serrated, shining and smooth beneath, outer involucrum reflexed;" and *Dahlia frustranea* (barren rayed dahlia), " having the stem hoary, and the florets of the ray neuter or barren;" which Loudon thus describes, " Rachis of leaves naked, leaflets ovate-acuminate, serrated, roughish beneath, outer involucrum spreading †."

But by gardeners and cultivators they are better known by the division of, 1. Globe-flowered Dahlias; 2. Anemone-flowered Dahlias; 3. Camellia-flowered Dahlias; and this division, although not quite botanically correct, is sufficient for practical purposes, and has therefore been employed by the nurserymen in making up their lists of the varieties of dahlia for sale, although they divide the last species into two, 1. That including the spotted, shaded, and striped dahlias; and, 2. Those of a single colour, or *self-coloured* dahlias.

---

* Hort. Kewenis, vol. v. p. 87.

† Loudon's Encyclopædia of Plants, p. 719.

As it is useful that the cultivator should be made acquainted with the properties of a fine dahlia, they are thus correctly and fully described by Mr J. Mantell in his Floriculture, as extracted from the Floricultural Cabinet for October 1834:

### " *Criteria of a fine Double Dahlia.*

" The flower should be erect, and stand completely above the foliage; for if the peduncle be short, so that the flower be hid among the leaves, it will not be displayed to advantage.

" *Form, colour,* and *size,* are considered the essential properties of a fine dahlia.

" 1. *Form.*—All good judges allow that perfection in form consists in the near approach to a hemisphere. The Springfield Rival may be given as an instance of the nearest approximation to a perfect flower. It is, however, too flat in the centre, and the outward petals are reflected. It is essential that the outline should form a true circle, and consequently the petals should be regularly disposed, rounded, smooth at the edges, or rose-leaved, and slightly concave, but not so much as to let the back of the petals be seen in the front of the flower. Those flowers whose petals are narrow, pointed, notched, or fimbriated, as well as those that are flat or convex, however desirable for the flower border, are objectionable as show flowers; as are also those which, when fully blown, exhibit the eye or disk. In some dahlias the petals near the centre converge, and conceal the disk, which, when the florets are fully expanded, becomes exposed. These are, therefore, pronounced by florists imperfect flowers.

" If the hemispherical form be assumed as the point of perfection in the dahlia, those flowers would be preferred that rather exceed than fall short of this standard. The Countess of Liverpool has been adduced as an illustration of the former, and Lady Grenville of the latter; and the mean between these two examples constitutes an excellent criterion whereby to judge of perfection in the form of the dahlia.

" 2. *Colour.*—As it regards colour much must depend upon taste, but selfs, of whatever colour they may be, should be bright and distinct. In striped, spotted, tipped, or variegated varieties, the colours should be well defined, and every petal uniformly and distinctly marked. Those that are pounced, blotched, variously or irregularly marked, are inadmissible as show flowers.

" 3. *Size.*—When other properties are equal, size will determine the preference; but, in judging of a good dahlia, form must have the pre-eminence, then colour, and lastly size; but in no instance should either form or colour be sacrificed to size. The relative proportions of excellence in these criteria have been thus estimated: Form *three,* colour *two,* size one

Thus a dahlia possessing the properties of form and colour would be judged superior to one having colour and size, the relative proportions being as five to three. *By this standard the comparative merits of this class of show flowers have been estimated by the censors at the Exhibition of the Metropolitan Florist's Society."*

See also the directions by the Cambridgeshire Horticultural Society to their Judges, in Floricultural Cabinet, June 1834, p. 144.

The dahlia, which is a perennial, may be cultivated either as a perennial bulb, or as an annual; as, however, the old plants flower somewhat earlier than those produced from seeds, and as the finest flowers already obtained are continued in this way, a cultivator will not fail to have a few old bulbs on this account; but as the varieties are found to degenerate when grown too long from the same old bulbs, it will be advisable every few years to continue these plants by cuttings, according to the directions afterwards given.

I shall now proceed to mention the various objects to be attended to in the cultivation of the dahlia; and the first thing I shall notice is the soil. This plant is nowise particular as to this, its native soil being the "sandy meadows of Mexico;" but it will, of course, grow stronger in a good loam, which I should prefer; but for particular purposes, such as dwarfing the plants, or bringing them sooner into flower, a light garden mould, with a considerable proportion of sand, is probably best fitted.* As the dahlia is a strong growing plant, with large tuberous roots, it will exhaust the soil; and the place of their growth must either be changed annually, or a portion of dung must be given, in the same manner as to the potato. It is said the variegated and spotted dahlias, in order to continue the variegations, require either peat or a sandy soil. There is no doubt most of these sorts are very inconstant; poverty of soil produces variegations in other sorts of plants, and will probably continue it in the dahlia when once obtained.†

The different modes of propagating this plant shall now be considered. 1*st*, From Seeds; 2*d*, From the old Roots; 3*d*, From Cuttings; and, 4*th*, By Grafting.

---

* "The plants grow freely in any soil or situation; but the poorer the ground is, the smaller the size of the plant, and the earlier and more abundant the flowers."—*Loudon's Encyclopædia of Plants*, p. 718.

† If a variegated sort throw self-coloured flowers, let them be cut off, and the later ones will probably be variegated.

1. *From Seeds.*—If you have dahlia plants, nothing is more simple than to procure seeds from them. The selection ought to be made from fine double flowers, of which every cultivator will have some; or if not, and he wish to raise plants from seeds, he ought to procure a few roots of good sorts and different colours for the purpose. They can be obtained from any respectable nurseryman; and as the plants produced from cuttings, which is what they generally sell, are not so much to be depended on for seed the first season, being somewhat later in flowering, I would advise a few bulbs or root cuttings to be obtained, which, if applied for, may be got.* These ought each of them to have two buds or eyes, in the event of one of them being hurt or damaged, and giving way. Having thus procured plants for seeding, so soon as they produce one or two flowers, let the petals or flower leaves be pulled out; the strength of the plant is thus directed to the formation of the seed, and the removal of the petals prevents their rotting and destroying the seeds when produced, which they will otherwise do, more particularly in wet seasons. In this manner, in common seasons the seeds will be ripe in the beginning of October, when the heads may be separated from the stalk; they may be now laid on the flue of a vinery or hothouse, or other place, so as to deprive them of any superfluous moisture, after which they may be laid by for sowing in the spring: they may be kept in the calyx or head, but I have not found this necessary, and, when separated, they are most easily dried; but where it is late, and not very ripe, it may be useful to keep them in the calyx.

The seeds of selfs should be taken from plants having *bright* and *distinct* colours, which are also perfect flowers. The globe-flowered dahlias, a beautiful variety, and generally dwarfs, for they more rarely produce seeds, are commonly raised from the seeds of the anemone-flowered dahlias, although the globe-flowered dahlias occasionally produce seeds. Some kinds of the more perfect flowered dahlias will rarely produce seeds, the completeness of the flower preventing the appearance of the pistils and styles, without the last of which no seeds can be produced; but as dahlias often produce double, semi-double, and even single flowers upon the same plant, even this difficulty may be overcome, and seeds may be at times obtained from them.*

---

* Gordon, Forsyth and Company, Hogg of Paddington, and others of the London nurserymen, advertise the bulbs for sale at the price of the cuttings of the preceding year; and any nurseryman will, if desired, procure them. Of the newer sorts, it is very difficult to obtain roots; and Brewer boasts of being offered L. 20 for two roots of his "*Rival King*" this season, which he refused.

To a botanist unacquainted with the dahlia, it may appear singular, that, with the exception above mentioned, the double dahlias will yield seeds as easily, or nearly so, as the single ones, while there is a very material difference in the quality of the produce, and that about one-fourth or fifth part of the young plants thus raised from the seeds of double flowers will generally be double or semi-double, which is far more than can be reckoned upon with any other species of flower.

Having thus obtained seeds, which are also to be purchased from the nurserymen, but which will rarely be equally good as seeds obtained from the best flowers of the cultivator himself, he may sow it in the beginning or about the middle of March, in pots or boxes, put in a hothouse, vinery, or hotbed frame; and the general treatment of a tender annual may be considered as that best fitted for it. If a few plants are all that are wanted, they may be transplanted into separate pots, say thirty-twos, (about four inches diameter, and five inches deep;) and when again this becomes necessary, into still larger pots, say sixteens, (about five inches diameter, and seven deep,) in which they may remain until the season permits of their being planted out.† And at this time two things must be attended to; if kept too long in the vinery, hothouse, or hotbed, they will spindle, and will not flower so easily as when brought up more hardy; next, that, being very susceptible of frost, they must *on no account* be planted out in the open ground before the frosts are entirely over, say the beginning of June; and no treatment will make much difference in this respect. The old roots, if planted out *too soon*, will, like the potato, have their stems cut down, and be retarded in the flowering, but will recover the effects of the frost, and throw up fresh shoots; but the seedlings and cuttings perish. I found this both as to seedlings and cuttings, which were hardened as much as possible, by being put out in the day-time, and removed into the greenhouse at night, which, being put out under an evergreen to remain all night, which defended them from perpendicular frosts, were yet entirely killed by a frosty night betwixt the 26th and 27th of May. If, however, the plants are few in number, they may be put out earlier, and each of them should be covered at night with a garden-pot or hand-glass, which may make a few days' difference in the period of flowering; but I think that this difference will hardly compensate for the risk run, that of losing all the seedlings; and the difference of trouble to the cultivator will be so trifling, that I cannot recommend the experiment. My seedlings which were not put out until the first week of June, began to flower on the 21st of July; and more than three-fourths of them have flowered during the summer. During the last season, some seeds of the dahlia were accidentally mixed with some mignonette seed, and were sown out with them in the open border without heat; these made their appearance during the season, and several of them flowered during the summer. By continued sowing in this country, the dahlia may possibly hereafter bear the treatment of a hardy annual.

---

* It is said that many of the finest dahlias have been raised from seeds obtained from semi-double dahlias; but as the seedlings will very often resemble the parent, the more perfect the parent plants there is the greater chance of fine seedlings.

† Some persons say that planting and keeping them long in very small pots keeps the plants dwarf, which some persons consider an advantage.

It is proper to state, that the first flowers of seedlings are very frequently single,—that on the same seedling may sometimes be seen single, semi-double, and double flowers, and that the seedlings which are latest in flowering will probably turn out to have the best flowers. No seedling should therefore be pulled up and thrown away, until two or three of its flowers have been seen, and until it is decidedly ascertained to be single. In like manner, many of the semi-double flowering plants may the following year turn out double flowers. The bulbs of the seedlings which do not flower will keep and flower the next year.

It is sufficient to plant the seedlings at the distance of one foot each way, whereby they will occupy little room, as thereby the cultivator may grow betwixt eight and nine times the number upon the same space of ground; while the sorts show themselves equally well, although, no doubt, if room is no object, the same distance may be taken as for the old bulbs, which is three feet each way; but unless the grower wishes to compete for the prize of seedling dahlias, this distance appears to me unnecessary. The only other thing which may be mentioned as requiring somewhat different management from the old bulbs, and this likewise will apply to cuttings, is, that the roots or bulbs of the seedlings, be allowed to remain a little longer in the ground after the stems have been touched with the frost in October, so that the roots may be allowed to firm, so as to keep through the winter: where they are planted at one foot distance, the stems continue to protect them: but if the frost comes on severe, and continues a second night, for it is very rare to have frost for three nights successively early in the season, a little mulch or dung may be thrown over them, to protect them from the frost; about the middle or end of October, if not planted very late, their roots will be sufficiently hardened; they may then be taken up, and laid on a gravel walk, or in a back shade to dry, or other place where they can be protected from the frost, which they can easily be by throwing a mat, or a little mulch or dung over them at night; they may, after drying in this manner for two or three days, be put away and treated like the old bulbs.

II. *Growing from the old bulbs.*—Early in March* the roots or bulbs will be brought out from the place where they have been kept for the winter, and brought into the hot-house or vinery, where there is the convenience of one, placed on a floor or on a hotbed, and laid on the floor or above the ground. Here, in the course of two or three weeks, the roots will begin to put out shoots; as soon as it can be ascertained which of them are alive, all such as are of the finer sorts, or of which young plants are wanted, should be planted in largish pots, say twelves, (seven inches diameter, and six inches deep,) in good rich loam, which is tolerably dry, having been prepared, by being brought into the hot-house or vinery, or shed, some days previous to potting. Little or no water must be given until the plants begin to shoot freely; and as this is the most favourable time for multiplying fine and rare sorts, and of course all the new sorts, the cultivator will naturally be desirous of increasing them as much as possible; as soon, therefore, as a shoot gets two or three inches long, it may be cut off at the first joint,† and pot it in a small pot, a forty-eight, (three inches diameter, and four deep), or even a smaller pot if wished to be sent to a distance, where it will grow without difficulty, and will be ready to plant out at the same time with the parent plant, in June, as soon as the frost is over ; this will insure the bulbs continuing to throw out shoots as long as they are wanted. An old root will continue to throw out shoots in this way, and eight or ten or more plants may be got off one root, where the bulb has not been too much divided at first ; any particular variety may be multiplied in this way, and where there is the advantage of a hot-house, or even a hot-bed, a sufficient quantity of plants may be grown to supply the demands of the public, and there is no doubt, that, in this way, the new sorts are multiplied with a degree of rapidity which, to the uninitiated, will appear inconceivable. The nurserymen who grow dahlias for sale, begin to start the root in the month of January, in a hot-house, or even sooner. As the cuttings are ready, they are potted in fifties, for the convenience of packing and carriage ; and these cuttings, after a few weeks, will bear to be sent off (the practice is to send them off the first week of May) to any part of the United Kingdom.

---

* Some persons direct this to be done in February, but in this country March is quite time enough.

† This is different from the mode generally followed, but will be found to answer well, and will afford an additional number of plants.

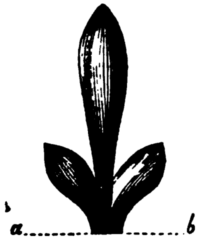
I now consider the old way of taking off a piece of the bulb as injurious to it, and have seen the parent bulb thus stript of every bud, rendered useless for the season, and perhaps altogether lost. A writer in the Floricultural Cabinet, who recommends cutting at a joint, is disposed to think that the bulb of the succeeding year is not so sure of growing next season.

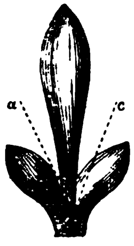
Mr Mantell, in his recent publication on Floriculture, says, " Where only a limited supply of strong and vigorous plants is required, we have recently discovered that the finest plants are produced by detaching the young shoots, when about two or three inches high, so as to include the cluster of buds surrounding the base of each shoot. Some care is necessary in this process ; the shoot should be held near the base by the finger and thumb, and by a slight motion of the hand it may be detached. If the operation be adroitly performed, the base of the shoot will present a convex appearance, surrounded by a number of buds, and a corresponding cavity will be formed in the crown of the plant, from which the shoot has been extracted. Plants raised by this mode not only produce the finest flowers, but the crowns invariably break the following spring, which is not always the case with plants raised from cuttings in the ordinary manner."

I rather incline to think, where there is reason to fear that a scarce plant may not throw out buds the following year, that it may be made to do so by cutting over the stem about the middle of September: this will cause it to throw up new shoots, and will, I think, make buds to appear the following season, if no where else, on the stem itself.

These cuttings do not require any very particular treatment: a little water should be given at the first planting, to settle the mould round them, and they must occasionally be supplied with water as they require it; by being kept shaded they strike more readily. In general, the root or tuber will continue to throw out shoots; but if the cultivator is too greedy, and cuts the shoot very close, he may perhaps leave the old tuber bare, and although it will continue to vegetate, it will not throw up any shoot, of course will not flower that season; where this has happened, I would recommend it being planted out in good rich mould, and well covered up; when lifted at the end of the season, it will generally be found to have thrown out a new tuber or roundish substance at the bottom, from which shoots will generally proceed the following year, but this is not to be depended on. It may also be used for grafting upon; but as inferior roots, even single dahlia roots, may be used for this purpose, the loss of a fine root, in this way, appears unadvisable.

It is right to mention here, that the London nurserymen who grow the new sorts of dahlia for sale, from their desire to obain as many plants as possible, make their cuttings so as to reain the two bottom side shoots thus. Instead of cutting the stem across, agreeable to the line *a b* in fig. 1, they cut in a slanting manner in the direction *a b c* of fig. 2, leaving the





cutting with a very small portion of the joint. Another account says, that, as the cutting will thrive, although not cut at a joint at all, that they cut above the joint altogether. Whichever of these two accounts is true, it has produced an effect, very possibly not contemplated or intended by them, but equally prejudicial to the purchasers of dahlias. The cutting thus made strikes root, and forms a tuber, and when planted out, flowers the first season, but the next year the tuber has no bud, and does not throw up any stalk, and in all probability, when this is discovered, is taken and thrown away, and thus the purchaser loses his new variety entirely. This is an additional reason for wishing to obtain a root, and not a mere cutting, of a new variety. A notice should be given to the nurseryman, or other person supplying the plant, that in this case, they must make good the deficiency, which will put an end to the practice, which, I have little doubt, arose from eagerness to increase a new variety, without any suspicion of its bad effects to the purchaser. From what is stated above, I consider it as probable, that the tubers of these cuttings produced the first year, although they do not throw up shoots or flower the second, will yet form an under tuber, which will throw up a shoot and flower in the third year or following year, if the tuber is preserved and remains alive; which, however, there is considerable hazard may not be the case.

III. *Propagating from Cuttings, properly so called.* We now proceed to consider the propagation of the dahlia by cuttings properly so called, or such cuttings as have no portion of root attached to them. As these cuttings have to form a bulb, as well as to flower, during the season, it is of importance to make them as early in the season as possible, and with this view, the early growth of the old bulbs is highly useful; the cutting may be taken off without in the smallest degree injuring or retarding the growth of the parent plant; as soon as the side shoots have grown long enough to enable them to be cut at a joint, which is highly useful for the formation of a root or new bulb. These cuttings may be planted in pots, or, if preferred, in a hotbed, which I should prefer, and in three weeks or a month, if the season is far enough advanced, may be removed and planted where they are to remain; and if planted out the beginning of June, or soon after, will flower the same season. Cuttings in this manner may be made any time previous to the end of June, and will generally flower during the summer, and although not early enough to flower the same season, will yet form bulbs which will keep through the winter, which may be treated like the old bulbs, and will flower the following year. When, however, from any cause, the cutting has not formed tubers but only roots, which will be the case where it is made late in the season, in order to preserve these roots, I would advise them to be potted in sand during the winter, and they can be re-potted in the spring, and be planted out at the proper season. Indeed, I have little doubt, that late cuttings may be made at any time from a growing plant, which will, if kept in a growing state in a hothouse, or a warm greenhouse, the temperature of which is never allowed to fall below 50° of Fahrenheit, form tubers, and be made to flower the following year; the chief difficulty in the case of a greenhouse, will be to prevent them damping off, and keep up the requisite temperature.

As dahlias, when long grown from the old bulbs, degenerate, it is advisable, every few years, to make cuttings to replace them, in order to keep up the variety, which can be easily done. Removing the original bulb, which is apt to decay, and become hollow in the heart, when old, may be advisable, even more frequently, and the plants may be grown from the newer portion of the roots, which may probably render the increase by cuttings not so essential. Cutting may, in like manner, be made from seedlings *before they flower*, but it seems advisable always to see the flower before any trouble is taken in this way; but it may happen that there is something curious in the leaf or stalk of the plant, which may make it desirable to preserve it; in such case, it can be done as soon as a side branch admits of its being cut at a joint; nor if it be done early enough in the season, need any difficulty be anticipated. The directions given above for the root cuttings, of course apply to these cuttings, and need not be repeated.*

---

* As a curious instance of the vitality of the dahlia, a gardener, in drawing out his seedlings, with only the seminal leaves, broke off the roots; he replaced the seedling, and in a week or ten days afterwards, it was found to have formed new roots.

IV. The last mode of propagating the dahlia is by *root-grafting*. This is done by putting in a part of a dahlia root *with a bud*, upon the root of another species, which has either no bud, or which, being of inferior value, has been deprived of it, and for this purpose the single flowering bulb will answer very well. In as far as the object is to procure any more plants of a new or fine kind, for which it is said to have been at first employed in this country by Mr Blake in 1820, it does not appear to me to be likely to be now much resorted to; but as it is possible that new striped, shaded, and spotted varieties, at present most in request by dahlia growers, may be obtained in this way, by taking two sorts of different colours, and by engrafting the one on the other, and procuring seeds from the flowers thus obtained from the grafted plant, I think it right to give the necessary directions, to enable the dahlia grower to carry the operation into effect successfully.* The directions for this operation are well described by Loudon in his Encyclopædia of Gardening, where it is stated to be a more speedy way of propagating double-flowering plants than by cuttings. I find no notice taken of this mode of propagating them in a French treatise on gardening, published in Paris so late as 1833; and although it must be known there from Loudon's book, which was published so far back as 1824, it cannot be much, or at all, employed there; and it is, I suspect, little resorted to now in this country.

The following are Loudon's directions:—

> "The cutting intended for the graft should be strong, and short jointed, having in it two or more joints or buds; it must also be procured as soon in the season as possible; when obtained, select a good tuber of a single sort, taking special care that it has no eyes; with a sharp knife (for a dull edge would mangle the fleshy root, and make it jagged, and so prevent a complete adhesion), cut off a slice from the upper part of the root, making at the bottom of the part so cut, a ledge whereon to rest the graft; this is recommended, because you cannot tongue the graft as you do a wood shoot; and the ledge is useful in keeping the cutting fixed in its place while you tie it; next cut the scion sloping, to fit, and cut it so, that a joint may be at the bottom of it, to rest on the aforesaid ledge; a union may be effected without the ledge, provided the graft can be well fixed to the tuber, but the work will not be so neat. It is of advantage, though it is not absolutely necessary,

---

* It appears to me more probable that the great number of variegated sorts have been produced by cross impregnation. This may easily be done, by taking off the pollen from one plant and laying it on the pistils of another sort with a camel-haired pencil.

that a joint should be at the end of the scion, for the scion will occasionally put forth new roots from the lower joint: the stem is formed from the upper joint. I therefore procure the cuttings with the two lower joints as near together as possible. After the graft has been tied, a piece of fine clay, such as is used for common grafting, must be placed round it; then pot the root in fine mould, in a pot of such a size, as will bury the graft half-way in the mould; place the pot on a little heat in the front of a cucumber or melon frame, if you chance to have one in work at the time: I prefer the front from the greater convenience of shading and watering which are required. A striking glass may be put over the graft, or not, as you please. In about three weeks the root should be shifted into a larger pot, if it be too soon to plant it in the border, which will probably be the case; for supposing the work was begun in March, the plant cannot go out until the end of May" (the beginning of June in this country is early enough), "so that the shifting will be very essential to promote its growth, till the proper season of planting out shall arrive."[*]

Having given directions as to propagating the dahlia, a few directions are proper for the treatment during its growth: these are few and simple. The proper distance for planting dahlias is three feet each way, and some persons say that they grow much stronger, and produce finer flowers, when they are allowed a space of four or five feet each way. For seedlings, I should consider one foot each way sufficient room; and as those which turn out single-flowered, will be pulled up as soon as this can be ascertained, a considerable additional space will be gained, and which will permit the double sorts to shew themselves.

The ground or border should be dug or trenched previous to planting, which is more necessary if dahlias have occupied it the previous season, and a little dung or compost will in such a case be necessary; and it will be in favour of the plants that the ground between the rows be stirred once a month during the summer, with a three-pronged or two-pronged fork (provincially *a grape)*, taking care not to break or injure the bulbs or roots.

It is advisable in all cases that the stems be reduced to three or two, and if intended for a competition, a single stem, with two or more flower-buds should be adopted; but, of course, there will be greater chance of losing the stem by snails or other vermin, which will therefore require to be more closely attended to. The stem or stems should be supported by stakes as they grow, to prevent their being broken over by the wind, which will otherwise happen. Seedlings, when first planted out, should get a little water to settle the roots, and if the weather prove dry, they will be the better of being occasionally watered in the evenings until rain falls, after which it will be unnecessary. If for competition, the plants may, when near flowering, be watered with manure-water, not too strong, and should be protected from rain in wet weather.

---

[*] Encyclopædia of Gardening, 2d edit. p. 845, and Hort. Trans. No. IV. p. 476.

I shall here give the practice of a person who was passionately fond of dahlias, who, although I think he gave himself a great deal of needless trouble, yet as he was very successful in producing fine flowers, some gardeners may be tempted to imitate. He dug over his spot of ground, for he grew his dahlias always in the same plot, at least three times during the previous winter, and gave it a considerable quantity of manure previous to planting his tubers in the month of April; he put a quantity of pure sand round the tuber, and, as might be supposed from this circumstance, the shoots were poor and weak; he now reduced them to a single shoot, and as he was afraid of the snails destroying it, he very frequently dusted it, and the ground round it, with quicklime. The roots having at last got through the sand, penetrated into the manured soil, and then the plant became in the highest degree flourishing, and produced fine strong vigorous flowers.

It has been said, that where the cultivator can keep his finer dahlias, when preparing them for planting in March, in pots, under cover, either in the hothouse, vinery, or greenhouse, or under a cold frame covered with a mat, it may be proper to do so; but even where he has not these conveniences, it seems advisable that the roots or tubers be taken up from the pit or other place where they are kept, at least a fortnight before they are planted out, and they may be put into a shade or garden-house in order to ascertain if any of them have given way during the winter; if brought into an out-house or dwelling-house the living plants will soon give signs of life, by putting out buds; if they do not do so, there will be a risk of blanks in the dahlia ground; such as shew life may be planted out, where they are to remain.

When the dahlias are few in number they may be planted along the flower-border at different intervals, to [illegible] the nature of the space allotted for them. It may be [illegible]ul to remark that close planting makes them taller than they would otherwise be, as they draw up one another;—that planting in a bed gives them a more shewy appearance;—while planting separately shews off the individual plants to greater advantage. If planted in a bed, the lower or dwarf plants will, of course, be placed nearest the spot or walk from which they will be commonly seen. The old bulbs may be planted from the 15th of April to the 15th of May in the open ground, and a large pot will be put near the plant, and when it shews itself above ground they should be covered every evening to protect them from frost; and this must be attended to until all danger of frost is over, which may be when the first week of June is past; after this time any slight frost may blacken the leaves, but will not much retard the flowering of the plant. When treated in this way, the shoots will be stronger, and the plants will probably flower a fortnight sooner than they would do if planted about the 15th of May, as, before these plants are come above ground, the frosts will probably be over, so that it is only in very uncommon seasons that they will receive any injury; and although seedlings or cuttings thus exposed will perish, old plants will rarely do so, but even if much injured, will throw up fresh shoots.

Dahlias will flower from the beginning or middle of July until they are cut down by the frosts in the month of October, or, if in favourable situations, until the month of November, thus forming a most delightful ornament to the flower-garden.

It is now proper to give a few directions for taking up and storing the bulbs during the winter. Some persons allow them to remain all winter in the ground, and, if the frost prove severe, cover the bed with mulch, or dung, or straw; and, if the winter prove very mild, like the winter 1833–34, this may be done without the loss of the plants; but a gardener in this neighbourhood who did so, has had almost all his plants flower single the following season, although this may have proceeded from other causes*. It is, however, quite evident, if the winter prove very severe, that a person might lose his whole stock of plants by so doing; and therefore, I do not think that the doing so is to be recommended. I have, however, seen dahlia roots left in the ground uninjured, while others in the neighbourhood the same season were destroyed.

---

* I incline to ascribe it to the exhaustion of the ground, plants which have once flowered double, can be brought back to double flowers by change of soil and manure.

By the time the first frost attacks them in October, the old tubers may be taken up, but if the frost does not prove very severe, and comes on early in the season, they may be allowed to remain eight or ten days longer in the ground to harden, (the tubers of the seedlings and cuttings should be allowed to remain a fortnight longer), spreading a little straw or mulch over them to prevent their being injured by the frost; they should be taken up in a dry day, if windy so much the better, and be allowed to remain all day on a gravel walk, to allow the superfluous moisture to drain from them, and be covered over at night with mats, so as to prevent injury from frost; if, however, any danger is apprehended from this cause, they should be removed into a garden-house, back-shade, or other house, and the new tubers will, when taken up, be treated in a similar manner.

The two great dangers to the tubers to be apprehended during the winter is from over moisture when they mould, and from frost, which destroys their texture; they even suffer from extreme dryness, but this is not so frequent as the other two causes. An instance occurred in this neighbourhood, where a gardener placed them below his bed to remain during the winter, and in the spring he found the tubers all dead from over dryness.

The bulbs may be put among sand like carrots, which will generally answer well. I observe one gardener recommends chaff as an infallible preservative, and I have no doubt it will answer well; but if the bulbs are numerous, it may be necessary to put them under ground, and cover them up like potatoes in pits, such pits being deep enough not to be reached by frost, and having sand at the bottom to allow the superfluous moisture to run off. The preservation of the tubers does not seem attended with any peculiar difficulty, yet every season I hear of gardeners losing their whole stock of roots. I have found mine to keep well in a wine cellar within the house. If not tolerably ripened when taken up, they will hardly keep in any situation. My gardener brought me some roots of the King of the Whites in 1833, which he had got from a neighbouring gardener, who had taken them up while the plant was in flower; they were kept in the greenhouse from that period

(August) until October, when they were put into the cellar with the roots of the other dahlias for the winter, but in the spring they were the only roots found dead. I have little doubt that, had they been replanted immediately, they would have pushed out fresh shoots, as I have seen other roots taken up and replanted at that season do; that they would thus have ripened, and would have come through the winter as well as any of the other roots; and in some cases I am disposed to attribute the loss of the dahlia roots to their being put away in an improper and unripened state. I got a cutting of the Crimson Globe late in the season. It was at first planted out, but finding it would not flower, I put it into a pot and brought it into the greenhouse. It was taken up in November, and put in a pot filled with sand, and it was put on the back-flue of the greenhouse. It was again potted in the beginning of March, and is now shooting fast; indeed, one cutting has already been taken from it: and it will flower this season. I would recommend some plan such as this to be adopted with all weakly plants.

It may be expected that I should give the dahlia grower some directions for the choice and purchase of dahlias; and no doubt I could easily make out a list of those dahlias which are *at present* most esteemed, either for rarity or beauty; but any list of a flower, of which hundreds of new sorts are brought forward every year, would be of little or no use. There was a list of dahlias given in the Gardener's Magazine a few years ago, hardly one of which can now be found in any nurseryman's catalogue, they having been totally superseded by newer and finer sorts, which affords little prospect of any such list being of any use.

The most esteemed varieties at present will be found in the note below.*

---

* *List of Superior Dahlias, recommended by Samuel Widnall in Spring* 1834.—Alba fimbriata, Alba purpurea, Belladona, Felgatis negro, Foster's Erecta, Foster's Negress, Grand Duke of Tuscany, Jaune Insurmountable, King of the Yellows, Lady Grey, Lord Liverpool, Marchioness of Abercorn, Metropolitan, Neptune, New Scarlet Turban, Pencilled White, Pothecary's Queen of Sheba, Pieta formosissima, Queen of Dahlias, Shannon, Sir Robert Peel, Springfield Rival, Widnall's Black Prince, Carna, Cleopatra, Comus, Diana, Duchess of Bedford, Enchanter, Golconda, Granta, Iris, Jason, Othello, Perfection, Remus, and Rising Sun.

*List of Dahlias recommended by W. J. P. in Harrison's Floricultural Cabinet,*

1. All newly raised sorts bear a high price the *first season*, and therefore any person wishing for these must lay his account to pay an extra price.

2. Such new plants will the year following generally fall to half price, or even less, when the first price has been very high; or the roots may be obtained at the price which the cuttings cost the previous season, some of the London nurserymen advertising to this effect; nor do I suppose that any nurseryman will refuse to give them at that rate.

If cuttings are taken, they will be sent out by the nurserymen the first week of May; if the bulbs are preferred, they ought to be procured before they begin to shoot, otherwise, if the shoots, which are at first very tender, are destroyed, the plant will not throw up another shoot that season, especially if the nurseryman has been sparing, and sent only a small portion of the root. In this way I lost a plant of the Hanoverian Stripe, which, in consequence of the only shoot being broken, the plant did not send up any new shoot, and was totally lost, as it died in the course of the summer.

With regard to catalogues of dahlias, they are published annually by the nurserymen. Most of the London lists contain the *names* of the flowers, the *colours*, and the *heights*, which last is of course only an approximation to the truth, but is sufficient to give a purchaser some idea of the kind of plant he is purchasing, and also the prices. The list of Michael Brewer senior, London Road, Cambridge, is the fullest and most descriptive catalogue I have seen. Mr Samuel Widnall, florist, Grantchester, near Cambridge, and Mr James Levick, florist, near Sheffield, either of these I would consider as very

*December* 1834.—I know most of this list, which appears a very good selection.—Criterion, Queen of Dahlias, Levick's Lord Milton, Widnall's Perfection, Springfield Rival, Lady Fitzharris, Lady Grenville, Levick's Beauty of Sheffield, Maid of Saint Leonard's, Countess of Liverpool, Lord Stanley, Duchess of Richmond, Lord Liverpool, Augusta, King of the Whites, Queen of the Whites, Crimson Globe, Metropolitan Blush, Fair Helen, Pieta formosissima, Enchantress, Negro Boy, Dawson's Victory, and Queen of the Yellows.

I may also refer to the Gardener's Magazine, vol. x. p. 151 (April 1834), for a list, most of which can now be obtained at much lower prices. The Floricultural Cabinet for December 1834, contains a list of the dahlias which gained the greatest number of prizes in 1834, being 179 sorts, so that by attending to this a selection of fine dahlias can be easily made.

excellent nurserymen for this plant; and as they publish new catalogues every spring, on application to them, they will send them by post (for they are printed on a single sheet on purpose), and if orders are sent in April, the plants would be sent off the first week of May.

The whole of the London nurserymen will supply this plant. The following, however, pay more attention to it than the others:—Lee, Hammersmith Nursery; Dennis and Co. King's Road, Chelsea; John Wilmot and Co., Lewisham, near Greenwich, Kent; Ronalds and Son, Brentford, Middlesex; Chandler and Sons, Vauxhall; Young and Penny, Milford Nursery, near Godalming, Surrey; Charles, James, and Peter Young, Epsom; Gordon, Forsyth and Co., Fenchurch Street, London; Barret of Wakefield, Yorkshire; and Turner of Sheffield.

If a cultivator desire to get plants from Paris, this he can easily do by an application to Fromont (*à l'Institut Royal Horticole de Fromont*), who is the first grower of this plant near that city. Of course the expense of getting them will be greater; and I suspect that as the English dahlias, which are said to be more dwarf in their growth, with more brilliant colours than the French ones, in a late publication of a French author,* it will hardly be worth the while. Those who wish for French plants would probably do better to get the seeds, which can be done at less expense, and without much trouble, and may occasionally be purchased in the seed-shops. Peter Lawson and Son of Edinburgh get over seed annually from Paris. I got a little French seed from them in 1834, and the produce was nearly all doubles and semidoubles.

With regard to the lists of dahlias published by the Scotch nurserymen, that published by Thomas Handyside, seedsman, Musselburgh, now mentions the *names* and the *height* of the plants, the *colours*, but not *the prices*. I cannot, in mentioning this list, omit saying, that the plants are well selected, and the collection is as good as any in Scotland which I have seen. Peter Lawson and Son, Edinburgh, now print an annual catalogue, which states the prices (which are moderate), and the colours, but does not mention the height of the sorts. It requires some previous knowledge of the sorts to select from this catalogue. James Stewart, nurseryman in Dundee, printed a catalogue *some*

---

* Le Bon Jardinier, Paris, 1833, p. 693.

*years ago*, which contains the *names*, *colours*, *heights*, and *prices* at that time. In his later editions he has left out *the prices*, which will not suit a list printed so long ago.

I am informed William Urquhart and Sons, Dundee, and Dickson and Turnbull, Perth, print lists of their dahlias, both of whose collections are excellent. From all which it will be apparent, that in order to select the plants, a purchaser should, if possible, see the collections themselves in the month of August, or beginning of September, at which time the dahlias are in full beauty. The general price runs from one shilling to half-a-crown a plant, which it will not exceed, excepting for very new ones, which may be five shillings each. Some sorts the first season will exceed that price, and several of our nurserymen now get the new sorts from the growers as early as the London nurserymen.

## ON THE STATISTICS OF SWEDEN.

By Mr George Stephens, Land-Drainer, Edinburgh.

The Statistics and Political Economy of Sweden being so very little known in Britain, I flatter myself the following information, derived partly from Forsell's Statistics, published in 1831, and partly from personal observation, will be acceptable to the readers of this Journal.

The country stretches from 55° to 71° of north latitude, and contains about 170,192 square miles, whereof 21,912 are lakes, mosses, and morasses; 137,412 rock, natural wood, and barren land; 7,370 meadow and enclosed pasture; and 3,487 arable land. Immense tracts of morass, moss, and natural meadow, have of late years been improved, and nearly the whole is capable of improvement. The climate varies according to the latitude, the vicinity of the sea, and other circumstances; the greatest degree of heat at Stockholm on the 3d July 1811, was 36° Celsius or 96° Fahrenheit, and of cold the 20th January 1814, 32° Celsius or 56° Fahrenheit below the freezing point. Above the sixty-first degree, the quicksilver begins to freeze in severe winters, so that it is not possible to make observations with mercury any farther north. In the southern parts of the country, 500 feet of altitude above the sea is found to have the same effect on the climate and vegetation as 175 miles of north latitude, a thousand feet as 300 miles, and two thousand feet as 630 miles; this alteration, however, will be less the farther north we proceed.

At Torneä the longest day is 21½ hours, at Stockholm 18½ hours, and at Lund in Scania 17 hours 28 minutes; from the top of a hill near Over Torneä, the sun in clear weather at midsummer is seen above the horizon for several days without setting. Many travellers visit that place merely to witness such a glorious sight, but it sometimes happens that they are obliged to retrace their steps without being able to accomplish their object, on account of the weather being thick and hazy. The medium quantity of rain that has fallen annually during the last thirty-six years has been 17½ decimal inches, which circumstance alone is sufficient to shew that the climate is much more dry than in Britain, and consequently a great deal warmer. In the province of Scania, grapes, mulberries, sweet chestnuts, walnuts, and melons, ripen in the open air; apples, pears, plums, and cherries, as far north as the 63°; gooseberries, and many other kinds of berries, several degrees farther. At the North Cape potatoes are cultivated in the gardens; at Alten, which lies in the 70th degree, barley is cultivated; and at Enontikis, both barley and turnips, which have given nine good crops during the last thirty years. Rye cannot be cultivated to advantage farther north than the 66°; wheat and hops to the 62°; oats seldom ripen in a higher latitude than 62°. Natural oak is not found farther north than 61°, but, if planted in a sheltered situation, will grow as far as 63°; ash and willow to 62°; elm and lime-trees to the 61°; beech does not grow wild in Sweden farther than 57°, but in Norway two degrees farther; fir grows to within 2800 feet of the line of perpetual snow; spruce to within 3200; and the black prickly dwarf birch (*Betula nana*) grows 400 nearer the perpetual snow *. The röding (*Salmo*

---

* Ariskutan in Jemtland, situated in the 63°, is 4919 feet above the level of the sea, and is not thought to be within the line of perpetual snow, although there are spots never free. Under the equator the line of perpetual snow is found to be 15,621 feet above the level of the sea. In Mexico, at 14,903; the Pyrenees, at 10,147; the Alps, at 8,878; in Iceland, at 3,055; and immediately south of Quebec, 8,244 feet above the level of the sea.

*alpinus*) is the only fish that thrives in the lakes situated at such an high altitude. The only wild berry that ripens at such an altitude is the cranberry. The Laplander seldom pitches his tent higher than within 800 feet of the line of perpetual snow.

In the provinces of Jemtland, the climate is so much against agriculture, that the people are obliged to pile up large quantities of wood along the north side of the small patches of land sown with grain, that in case the wind (in the evenings of August) should come from the north or north-east, they may be set on fire to protect the crop from frost.

Another method of protecting the crop from being frozen when in ear, in general use in the southern parts of the country, is for two men to draw a rope across the heads of grain before the sun rises, by which means all the drops of dew are shaken off, and the ears become dry before the dew on them is frozen, which takes place (if allowed to remain) just at the time the sun rises. In travelling through the province of Smäland last year, I observed, in several fields that were sown with linseed, a quantity of wooden dishes filled with water, and, upon making inquiry, was given to understand that they were placed there to protect the lint from the frost, the water having the effect of drawing the superfluous dampness to the vessels, whereby the crop is saved.

I never saw such a method resorted to before, but was assured by several most respectable peasants, that it was the common practice in that part of the country, and that it generally had the desired effect.

The population of Sweden in 1751 was 1,785,727, and in 1830 was 2,904,588. There are eighty-four towns. Stockholm, the capital, has a population of 80,000; Gottenburgh 26,700; and the remainder a total number of 172,945.

There are two Universities, the one at Upsal the other at Lund. In 1830 the number of students was 2085, which is considerably more compared with the number of inhabitants than in any other country. The Swedish people, at the making of the Diet in 1828, was represented by 492 nobles, 57 clergy, 47 of the trades' members, and 122 peasants.

Each nobleman has a vote in his own right, the other members are chosen by their constituents, each class being bound to pay their representatives' expenses during the meeting. The Diet meets every fifth year.

The standing army consists of 2580 artillery, 4705 cavalry, and 25,409 infantry; total, 32,694. Each soldier has a house, barn, cow-house, and six acres of land. Besides the above army, every male person between twenty and twenty-five years of age, is regularly exercised about three weeks every year during the above period, and is liable to be called into active service in case of war; this class amounts to 106,603, making the whole disposable force of Sweden alone 139,294, and 23,205 sailors and sea-marines. Norway 12,000.

The fleet consists of ten ships of the line, thirteen frigates, and 524 other armed vessels.

No man is admitted into the standing army or navy unless he can produce a good character from the clergyman of the parish to which he belongs; by which regulation there are fewer depredations committed by the Swedish soldiers both at home and in foreign countries than in any other army.

At home they are employed in cultivating their small possessions for the support of themselves and family, and working occasionally to their neighbours for payment. In the field of battle they have always distinguished themselves the most brave, and obliging towards their officers. In a financial and civil point of view, Sweden is divided into twenty-four governments (Läns), each län into districts (Härads) and parishes, and each parish into farms (Hemmans), which are again subdivided into three-fourths, halves, quarters, and sixteenth parts, and even less. A hemman, however, has no fixed quantity of land; it may contain a hundred acres or as many thousands; for example, a three-eighth part of a hemman in the province of Wermland, called Aspeberget, contains 33,770 acres. There are 66,441½ hemmans, and 187,526 small possessions, which do not belong to any hemman. Each hemman and small possession is subjected to a land-tax of two dollars for every portion of land, mill, or saw-work, worth a thousand dollars—the value is fixed yearly by a committee appointed in each parish by the governor. Besides the land-tax, landed property is subjected to several others, such as keeping in repair a certain portion of the public roads, sending horses to the different post-houses at certain times for the conveniency of travellers, providing of soldiers, tithe, &c.; the whole taxes on a hemman worth 6000 dollars is about 180 dollars yearly. A person receiving a salary of 600 dollars a year pays a tax of 1 per cent,; from 600 to 1200, 2 per cent.; and above 1200, 3 per cent. Every male person from seventeen years to sixty pays about sixteenpence, and every female half that sum yearly.

In each province there is a governor (Landshöfding), who presides over all civil cases, and a jury court (Härads-rätt) with a judge and thirteen jurymen (Näindemen), who likewise act as constable officers of the crown; they are chosen from among the most respectable of the peasants, for no particular period; but as long as they are willing to act in that capacity, they have a small salary from the crown, and a certain sum for every person they summon. All deeds must be recorded at this court.

Any person not contented with the determination of the häradsrätt may appeal to the laymansrätt, who is a superior judge, and from the laymansrätt to the Hofsrätt, which is something like our Court of Session, and from thence to the King.

Prior to 1800, nearly the whole of the Swedish peasantry lived in villages, having all their infield lands intermixed; but, in 1803, an act was passed by the Diet for measuring and dividing the whole of the arable land, and giving each proprietor whatever portion he possessed, in one place, the government allowing a certain sum, according to the extent, for rebuilding the steadings. Since the promulgation of that useful law, till the end of 1825, 5517 hemmans have been separated from the villages, and an immense number of small possessions have been enclosed and cultivated. In the province of Wester Gothland alone, 3000 acres of the crown commons have been divided and given to the labouring class, upon paying a small tax. The separation of the lands from the villages has been attended with the greatest advantages, for it has not only given the people an opportunity of enclosing them, but many of them have divided them into regular fields and farms, and built good steadings. An improved mode of cultivation has sprung up in many districts little inferior to our improved system of agriculture. If we compare Sweden with any other country in Europe, with respect to population, I suppose no other has made such a rapid progress in agriculture.

In 1805, the quantity of all kinds of grain sown in Sweden was 1,141,000 tunnor (each tunna is nearly $4\frac{1}{3}$ bushels), which gave, after the seed corn was deducted, 4,564,000; the same year 90,000 tunnor of potatoes were planted, which gave 360,000: and in 1828, 1,469,000 tunnor of grain were sown, which gave 6,499,000; the same year 460,000 tunnor of potatoes were planted, which gave 3,248,000.

During the same period the population increased 18 per cent., and the production of grain 42 per cent.

The price of grain, according to the crown fiars (Riks Markegängs prisit), half rye and half barley, for the last sixteen years, has been as follows. For a tunna ($4\frac{1}{3}$ bushels),

| Dolls. | Dolls. | Dolls. | Dolls. |
|---|---|---|---|
| 1816 = $7\frac{1}{3}$ | 1820 = $9\frac{1}{4}$ | 1824 = 6 | 1828 = $6\frac{16}{48}$ |
| 1817 = $8\frac{1}{3}$ | 1821 = $7\frac{1}{4}$ | 1825 = 6 | 1829 = 6 |
| 1818 = $8\frac{1}{2}$ | 1822 = 6 | 1826 = 6 | 1830 = $6\frac{7}{12}$ |
| 1819 = $9\frac{2}{3}$ | 1823 = $6\frac{1}{3}$ | 1827 = $9\frac{19}{48}$ | 1831 = $7\frac{9}{48}$ |

averaging about 8 dollars for $4\frac{1}{3}$ bushels, which are about two-thirds of a pound sterling.

During the same period the average price of wheat was 10 dollars; the quantity now produced being only about 207,677 tunnor; but it might be increased to three times that quantity, for a great part of the land of Scania, Easter Gothland, Southermanland, Upland, Westmoreland, Nericia, and part of Wester Gothland, and Dahlsland, is a good clay, which, with proper management, would give good crops of wheat; and I have not the least doubt, since the nobility have taken such a lively interest in agriculture, that they will be able to export within a few years equally as much wheat as they formerly imported grain altogether. Through the great improvements in agriculture during the last thirty years, the Swedes have become exporters of grain to a considerable extent. In 1828, they exported to the value of 961,800 dollars; and, as seven-ninths of the population are engaged in the cultivation of the soil, there can be little doubt many times that value will be exported within a few years.

Every proprietor and occupier of land has a right to distil spirits; the size of still and the amount of duty depending on the value of the property. In 1829 there were 167,744 stills going, which were calculated to make within the year 30,000,000 gallons, worth as many rixdollars, and pay a duty of 434,396 dollars, a little more than a farthing a gallon.

Distilling is very advantageous to the agriculturist in more respects than one; it not only enables him to keep a greater number of cattle, but he has also a larger quantity of manure; and when the crop is turned into spirits it is much easier carried to market, where it is generally sold to good advantage. In a moral point of view one would be apt to believe that the cheapness of spirits would have a powerful effect in corrupting the morals of the people, which no doubt sometimes is the case; but, taking the people generally, it is not the case; for during the whole of my residence in that country, I have seen only two intoxicated women, and one of them came from the neighbourhood of Edinburgh. In 1832, I was at Carlstadt market, when at least 10,000 people were collected from all quarters within 100 miles, besides many from Norway; but in that multitude I did not see a single person that was the worse of liquor. Every person found drunk is fined three dollars, or sent to the house of correction for a certain number of days to work.

The ground capital of Sweden is 378,644,919 dollars, and the whole of the taxes on land amount to 20 millions, of which only about 10 millions go out in cash; the other part forming the rent of the crown-lands in possession of the military, and other officers of the State, and the clergy.

If we take the average price of grain in Sweden, per tunna, to be,—for wheat, 10 dollars; rye, $8\frac{1}{4}\frac{1}{8}$; barley, $6\frac{1}{4}\frac{1}{8}$; barley and oats mixed (which kind of crop is very much used), 4 dollars; oats, 3; peas, 7; and potatoes, $1\frac{1}{2}$,—the whole production of the soil will amount to 45 millions of dollars. The iron-works produce 10 millions of dollars; other manufactures, 8; commerce, fisheries, and forests, 20; which give a total of 8[illegible] millions of dollars.

The mercantile concerns of Sweden are by no means in a flourishing state, which the following extracts of the export and import trade completely shew:—There was exported in 1824 to the value

of 11,397,058 dollars, and imported the same year to the value of 9,802,047; in 1825, exported 12,228,328, imported 13,587,138
... 1826, ...... 10,275,961, ...... 14,863,115
... 1827, ...... 12,186,909, ...... 14,294,542
... 1828, ...... 12,892,598, ...... 15,085,273
... 1829, ...... 11,310,947, ...... 15,013,935

The great difference between the export and import of 1826 and 1827, was owing to the failure of the crop in 1826, when 315,470 tunnor of grain were obliged to be imported in 1827; but in 1828, there was grain exported to the value of 961,800 dollars; but there are no reasons given why the import of 1829 exceeded the exports by 3,702,988 dollars. Bonded goods are not included in the above calculations. Foreign vessels were employed in the export trade to the amount of 3,188,518 dollars, and in the import trade, of 5,222,254.

Although the above calculations shew a considerable column against the trade of the country, yet the home manufactures are considerably improved; for, according to the report of the College of Commission, to his Majesty, in 1829, great improvement has taken place in the manufacture of every kind of goods. In 1828, the value of manufactured goods was 7,915,089 dollars, and the following year they amounted to 8,499,658. The home manufacture of nearly all description of goods, is very extensively carried on; but more particularly of linen, in the province of West Norland, where alone there was manufactured, in 1828, 109,628 yards, for which a premium of 3,497 dollars was given by the government. Nearly every family not only makes its own linen, but the most of the peasants build their houses, make their cloth, shoes, and the wood-work of their agricultural implements; bake their own bread, brew their beer, make the malt, kill their own meat, and, in fact, almost every thing belonging to housekeeping is prepared at home, which makes that department very difficult to be undertaken by foreigners. The long winter also obliges them to preserve large quantities of fruit and vegetables, which in general are very good. As I have before mentioned, the summers are generally very warm and dry, which causes all kind of fruit to ripen in the open air much better than they do in this country.

The value of land varies according to situation, and many other circumstances; in particular, whether the land is what is called Säteri (land endowed with particular privileges), Frälseland (land exempt from certain taxes), and Crono Skätleland (land held of the crown). Formerly, Säteri land could only be possessed by the nobility, and was free from all taxes; but now it may be possessed by any person; and, at the meeting of the Diet, after the Revolution of 1809, the nobility agreed to pay a certain share of the taxes, in proportion to the burdens of other lands.

In the province of Scania, where there is very little wood, a Swedish tunneland (which is about a Scotch acre) of good clay-land, situate eight or ten miles from a town, is worth from L. 5 to L. 8 Sterling; and land belonging to towns nearly tax-free, double that sum, and in some instances more.

Land has risen considerably in value within a few years, which is altogether owing to the exertions of the Agricultural Societies established within the provinces, and the great interest the landed proprietors now take in the improvement and management of their estates. Formerly, the young nobility went into the army and navy, and left the sole management of the agricultural department of their extensive properties to the land steward, who was generally as ignorant of his profession as the ox that drew the plough. But of late years, an enthusiasm has sprung up for the improvement of agriculture among all classes of the people, not to be equalled in any other continental country. English and German works on that subject are studied; improved agricultural implements from those countries are introduced; and in many places Scotchmen or Germans are seen directing the plough or conducting the operations of the field.

One of the first who commenced the improvement of Swedish agriculture, was C. G. Stjerrsvärd, of Engeltofta, in the province of Scania. When that gentleman purchased that property in 1794, for 33,752 rix dollars, its whole annual income was 779 Swedish bolls of all kinds of grain.

The land having been much intermixed with other property, very little improvement was attempted till after an act [illegible] passed in 1803, authorising the division, and collection, [illegible] consolidation of the different lots of land belonging to the [illegible] prietor, which each proprietor took the earliest advantage of, l by which means Mr Stjerrsvärd got 5,515 acres of his best d laid together, which he divided into farms, built good steads on them, and, through the assistance of the late Earl of llie, procured permission from the British Government to ry over from Scotland, land-stewards, ploughmen, blackths, and cart and plough wrights. With the assistance of se means, a new system of agriculture soon sprung up, which bled the owner, within sixteen years, to increase the produce grain from 779 to 7000 bolls, and the value of the land from 752 dollars to 450,000, which sum the property was sold in 1819, to his Swedish Majesty.

During the same period many other proprietors were not idle eparating their lands from the villages, and dividing them farms, and improving them to several times their former ue; but one of the most enterprising is C. G. Lundgrun of rrestad, near the small town Ystad, also in Scania. That perty, when purchased by Mr Lundgrun, having been maged by the former proprietor agreeably to the old system, did yield more than 700 bolls of grain, and fattened 60 oxen rly; the other items of produce were consumed on the proty. Since Mr Lundgrun became proprietor it has been died into suitable farms, with good farm-steadings, and the ater part of the land has been much improved, and is now naged according to improved principles of agriculture, the eriority of which will be better understood by the extraorary revenue which has been brought to him within thirteen rs, compared with what the former proprietor received; nely, 4800 bolls of grain, 12,000 of potatoes, 450 cwt. of ese, and 90 of butter; besides, it keeps, winter and summer, milch cows, 156 working oxen, 120 young cattle, 28 horses, 320 pigs; numbers of sheep and of day-labourers' cows; , over and above, supplies the family with grain and other essaries of life.

As before mentioned, every proprietor or farmer has a right listil spirits, the refuse of which alone enables him to keep a ge number of cattle, whereby the quantity of dung is very ch augmented; and as the distiller is not bound to use any ticular kind of grain or malt, a considerable quantity of potatoes is universally used in the distilleries, which accounts for the great production of potatoes at Mr Lundgrun's. In fact, the extended cultivation of the potato having been the principal, or one of the main springs, of the improvement of Swedish agriculture, not only has the necessity of using the bark of trees as a miserable substitute for bread been superseded, but the public and private magazines are so completely filled with grain. The only difficulty the cultivators of the soil have to contend with at present is the want of a market for their superfluous stock.

To encourage the improvement of the woollen manufactures, the Swedish government is making every exertion for the introduction of the Saxony breed of fine-woolled sheep into the country; and for this purpose, a person well acquainted with the habits and management of that breed, is engaged to make a general survey to ascertain the estates which are best adapted for making the experiment on, and also the number of proprietors who are willing to keep such sheep, and to report his opinions to the College of Commerce. After the report is made, he is dispatched annually to Saxony to select the number required, and to transport them to the country, the government paying all expenses, except the original outlay in Saxony, which is paid by the proprietors, unless in a few instances where the government pays the whole, and receives in return a certain percentage in sheep yearly till the whole is repaid. In this manner several thousands of Merino sheep have been imported during the last three years, and have been found to thrive exceedingly well; and although the whole flocks are obliged to be kept in houses during winter, and the greatest care must be taken that they do not go on wet or boggy ground in summer, and also that a register must be kept of the number and age of the sheep, which altogether makes their management very troublesome, they are found to pay a high per-centage for their keep. The more effectually to secure the success of this new branch of rural economy in Sweden, a wool-market was established in 1832 at Norköping, the principal manufacturing town, under the patronage of the College of Commerce, with a fund at the disposal of the College, to enable it to advance money on any quantity of wool which may not be sold on the market-day, in order that the producers may be able to keep it till a favourable opportunity offers for its disposal. The market is held in the end of July, and is attended by the principal land proprietors who have sheep. One lot of wool, in 1832, brought 6s. per Swedish pound, of about 14 English ounces, but the average price was from 3s. 6d. to 4s. The quantity offered at the market last year was 100,000 pounds, which brought about the same prices; but the quantity is now increasing so rapidly, that the market will soon be overstocked for home consumption, which will cause the proprietors to pay more attention to the improvement of the native breed of sheep, or to introduce one of less delicate habits, better adapted to the climate, and requiring less expense than the present mode of sheep-farming. If such a breed were introduced, it would give individuals occupying small portions of land a fair chance to compete with the great proprietors who at present monopolize the whole trade in sheep and wool. In the provinces of Halland and Scania there are very extensive tracts of land, which formerly were covered with beech wood, and which now produce short sweet herbage, well adapted for sheep pasture; and as the snow seldom lies long in these districts, and scarcely at all on the parts of them adjoining the sea, they would make capital walks for the Cheviot breed, which might soon produce the whole quantity of coarse wool now required to be imported.

From the above statements it will be seen that the Swedish government have done much within the last thirty years for the improvement of husbandry in all its branches, and that its endeavours have been amply rewarded by success; but there is still scope for increased exertion, as, wherever the traveller turns his eyes, there are to be seen large tracts of unimproved land, which, if cultivated, would not only render the climate more salubrious, but would produce a sufficient quantity of grain and live stock to maintain thrice the number of the present inhabitants in Sweden.

## ON THE USUAL MODE OF PREPARING MANURE ON FARMS.

Not any thing connected with agriculture is so material to production as the economy of manure; and in proportion to the quantity and quality of this necessary article, are the returns obtained from the land in all situations. The present system generally practised (if it can be so termed), has been much censured by scientific and practical men of experience and known abilities; and the most able chemist of our day, has gone so far as to estimate the loss of the stimulating properties in dung by the present process, at from one-half to two-thirds of what manure should possess when put into the land.

Enough is set forth in what follows to satisfy those who are not very sceptical, that the waste in the only useful properties in dung, is much beyond what is stated by Sir H. Davy, who was not likely to go into extremes, nor is this called for; but I believe my ideas are borne out by the practical facts which are known to be experienced in different parts of Europe, and these are so variable and gross as not to admit of definite computation. This art is almost coeval with man—is practised in every situation—and in all countries where the inhabitants are numerous, it is not only most important but indispensably necessary for their subsistence; and yet even in Britain, so far as I know, it is the only process that is conducted in opposition to scientific principles, notwithstanding that other branches of husbandry are prosecuted, perhaps, with more skill than elsewhere in any instance. The farmer very properly regulates himself by effects, and what appears to him most beneficial in practice; but there are good grounds for believing that he is for the most part very ignorant of the principles on which he ought to proceed, and frequently attributes results to causes very different from truth. It is natural that he should be peculiarly sceptical in this instance, where no material practical good has hitherto resulted from the light of science.

In order, however, to explain the prejudices which obstruct the introduction of any thing new in husbandry, the following observations may not be inapplicable:—

There is not any profession that affords more opportunity to experiment on a limited scale, without risk of loss, than farming; and yet there is none where so much opposition is experienced to whatever deviates from ancient custom.

It was long after the days of Tull ere the drill husbandry came into general use; upwards of a century elapsed after the introduction of the potato into Britain, before it was much raised even as a garden vegetable; and within the recollection of many, such were the prejudices of the Scottish peasantry, that by them every distemper that prevailed was attributed to its deleterious influence. Although cultivated as a culinary vegetable earlier than the potato, the turnip husbandry, now an indispensable part of our agricultural system, has not been long practised; in most other parts of Europe it is little used, and in many situations unknown as a field plant. But a few years ago, old meadow was considered most valuable, and was preserved and handed down from one generation to another as an heir-loom, but this is now believed in most situations to be injudicious; and it is usual to break up and occasionally to bring such lands under a regular routine of crops. Draining must necessarily have been practised at a very early period, but the immense utility of this was not generally known; nor was it extensively adopted with effect until within the last twenty years. Twenty years ago, over a great part of this country, where streams were stagnant, or the surface of the ground was in a constantly moist state, mildew and frost exceedingly injured the quality of the grain in the month of August, and prevented it from filling or ripening; but from more perfect draining, these evils are now little experienced. From this circumstance Scottish grain is now equal in quality to that of England, although formerly very inferior. We need not, therefore, be surprised at the difficulties in the way of introducing a better system in the preparation of manure, as the waste occasioned by the escape of the stimulating gases that are in dung are not immediately perceptible, and even rain mixing with the more soluble parts of the dung and washing away a very great proportion, is not so much noticed as defective crops from neglect in the mechanical operations in tillage.

Various opinions are prevalent as to the degree to which compost should be decomposed or reduced previously to being put into the ground. Sir Humphry Davy tells us that only a slight degree of fermentation should be permitted in farm-yard dung. The farmer, however, says that this will not answer in practice, and that the straw and other fibrous substances must be reduced in a greater degree, in order to bring the whole in contact with the plant to which it is to be applied, and to induce continuous decomposition, as well as to prevent the admission of air by means of the open nature of the straw in this state; also that decomposition must be carried to a greater extent than was contemplated by this talented chemist, in order to destroy the germs of the seeds of noxious weeds, and of insects which feed on and destroy the growing vegetables. It is admitted that these objections are in a considerable degree correct; but it does not follow that because Sir H. Davy may be in error in this particular point, his whole theory should be rejected, against the other parts of which this proves nothing; nor is it any reason why the practical farmer should run into an excess that seems to rest only on habit and conceit, and set at defiance every rule in science. It rarely happens that the man of science who defines certain chemical principles in the laboratory, carries these into operation on an extended scale, which is beyond the limits of his province, but more consistent with that of the practical man of experience, who ought to endeavour to conform art to science, and induce them to travel in unison with each other.

The present mode of preparing manure is to take the dung and litter from the original place of deposite, and throw these promiscuously into the general mass, in the dung court, repeatedly during the day, by which a fresh stimulus is as often added to the old matter, and a constant fermentation is kept up, so as to produce chemical changes very different from what are intended, and the exhaustion of those gases which form the only valuable properties in the dung. The dung, being more ponderous than the straw or litter, naturally falls to the bottom; and much of the litter remains on the upper surface, where it is useful in protecting the dung from the action of the sun and wind, and preventing the feet of the cattle from poaching and raising it up to the surface. The litter is, however, in this situation injurious, by admitting air sufficient to induce fermentation; whilst the straw, instead of being an absorbent, acts as conductors by which the rain is carried to the very bottom of the whole, and, mixing with the more soluble and richer parts of the dung, much of these are carried off through the opening *at the lowest point of the court* left for the escape of the superfluous moisture.

Every reflecting and intelligent individual must admit the waste occasioned by the mixture and escape of dung with rain water; but were the farmer told that there is more virtue in what is lost in this manner than in all the straw that can be used, he would not credit the fact. The evil in this case is sufficiently apparent to induce occasional attempts to collect these washings from the dung heap, and to apply them separately to the lands; but the only means to avert and strike at the root of the evil, is to exclude air and excess moisture. At the commencement of the operations already partly explained, the dung and litter occupy a limited space in the court, are in a loose heap, and rain falling upon and freely entering into it by means of the open nature of the straw, incorporates with the better part of the dung, which oozing from the heap spreads itself over the vacant space, and extends to the extremities as the materials are opened out; this liquid is quickly brought into a state of effervescence (as may be seen by the froth on its surface), and thus fermentation is occasioned throughout, which is further excited by a constant supply of hot dung from the cattle. Most animal and vegetable substances, vegetating or dead, are exceedingly influenced by changes in the atmosphere, from causes but imperfectly understood; the freshest straw in the dunghill indicates this by becoming yellow during frost, and that which is mixed with dung and exposed to the air, assumes the dark colour of the liquid matter which oozes from the heap, whilst the succeeding thaw, in its effects, evinces that the whole has by frost been prepared for more rapid dissolution of the most solid materials than at the same temperature previously. Thus the whole are acted upon by every degree of variation in the weather, at every stage; and can it be imagined that these changes take place without the induction of some, and the escape of other volatile principles, or is this irregularity of action consistent with any other systematic process? The farmer says that early fermentation is prevented by the stock trampling and consolidating the materials; but this is not done until enough is collected to cover the whole area of the court (nor is this regularly covered at any time), and the combined evils pointed out, have been sufficiently long in action to induce a heterogeneous nondescript species of fermentation, which renders the mischief perpetual and irremediable. The farmer is very prudently averse to change, until it is clearly demonstrated to him that he is to derive early advantage; and on this account I shall explain certain facts consistent with his own experience, and others derived from sources easily accessible to him, and which, in my mind, are sufficient to prove immense loss by his present practice, which cannot be made worse, but a moderate change may be a means of gain, without any material outlay or alteration in his mechanical arrangements. When manure is prepared in the open field, where stock are penned for this purpose, why is it found to possess less vegetative powers than what is dropped in the house and mixed in the dung-court, and found insufficient to raise a turnip crop without the addition of more potent compost? Why, because the materials are more exposed, and the evils already pointed out are allowed in this case to operate in an aggravated degree; the cattle drop perpetually over the whole, this is more generally mixed with the old materials, and upon the surface, where it is fully exposed to air and moisture; and the gases rising freely are exposed to the passing breeze. The materials used are the same in both situations, and with similar treatment, the manure should be so also. I have questioned several farmers, who are otherwise intelligent, on this head, as to the nature and effects of compost prepared in the field, when they replied that it was very good, but that it would not raise turnip without being mixed with hot dung, which is sufficient to show that they were ignorant of the principles by which they should be guided, and of the value of what it ought to be their chief object to preserve.

The gardener, for the purposes of his hot-beds, selects the freshest and strongest materials from the dung heap, which he exposes to air and moisture in order to induce as much action as possible, and in this excited state he applies them to the beds; in the course of a couple of weeks it is found necessary to use a portion of fresh dung, which is repeated at certain intervals until the advance of spring renders artificial heat less requisite.

The compost used in this way is ultimately found to have retained less of the stimulating gases than what is prepared in the dung court, but more than what is made in the field, as in this last situation the original materials are more exposed and constantly excited by the droppings from the cattle on the surface.

The extremes of production in different situations are most remarkable; chiefly arising from more or less means to manure, and the measures adopted for this purpose.

In Mr Jacob's Report on the agriculture and returns from the lands in the northern countries on the continent of Europe, the annual grain crops from the richest provinces in Poland (Podolia and Volhynia), is stated to be under what is obtained from the poorest districts of Scotland. On the other hand, it is obvious to every traveller that an exceedingly greater proportion of land is annually in grain, and the crops abundant, on every description of soil in Belgium, and the adjoining provinces of France, than in England, notwithstanding that, in the former situation, the grass and green crops are much more limited, and the cattle inferior in size and condition, and fewer in number. Such are the results of management in different situations; whence much useful information may be derived by tracing effects to their natural causes in the habits of the agriculturists or otherwise, and contrasting these with occurrences applicable to the same subject, not only at present but in times past, especially in the last thirty years, during which period turnip husbandry has been brought to high perfection; and this and draining have operated a change on the atmosphere, and the vegetable and animal productions of Britain, beyond what could have been anticipated by the most sanguine imagination.

Whether farm-yard manure be brought to the consistency only of what the farmer terms long dung, or his operations be carried much farther, as deemed necessary by most practical men, it is certain that these should be conducted on chemical principles, and assimilated to the operations and rules which guide the brewer and distiller. Were the manufacturer of beer, wine, &c. to practise in like manner as the farmer, and continue but for a few days beyond the period of his accustomed operations, repeatedly to add fresh stimulants to his worts, the products of his labour would be an admixture of alcohol, vinegar, and noxious matter foreign to his purpose; in fact not any process in which fermentation is requisite, bears the least resemblance to that of the farmer, and yet no reason has ever been given why he should practise to excess, what in all other cases of fermentation it is the leading object of the operator to avoid. The distiller, after each operation, carefully washes his fermenting vessels with a strong solution of white lime in water, to prevent acidity and the creation of vinegar instead of alcohol. The mixed substances of which farm-yard manure is composed, naturally undergo three stages of fermentation, the vinous, the acetous, and the putrefactive. These follow in regular succession, but if acid be added to wort during the vinous fermentation, this immediately induces the acetous fermentation; or if, in like manner, putrid matter be added, the putrefactive stage is brought on throughout the whole, *and heat and action subside sooner in proportion as fermentation has been advanced.*

Without a considerable degree of heat life cannot exist in animal or vegetable; and to a certain extent vegetation and circulation in the fluids of plants are increased according to the measure of heat applied to them; it must, therefore, necessarily be important in this view that manure should be used at as early a grade of fermentation as may be consistent with other practical purposes, *and that neither the acetous nor putrefactive fermentation be allowed prematurely to take place.*

Extraneous moisture and air must be excluded as much as possible from the materials of which manure is composed, and fermentation prevented until the time approaches for application to the land, when the atmosphere is usually at a temperature genial to this operation, which should be performed quickly, and to the point that is practically found best. This must depend on the proportion of fermentable properties that shall be preserved in the dung until it is to be deposited in the land, *as these alone can induce continued fermentation and decomposition to the ex-*

*tent that is most economical* and beneficial to the growing vegetable and the surrounding soil.

Thirty years ago, the distiller from grain fancied that he then extracted as much spirit as could be obtained; but he now produces 30 per cent. more than he did at that period, and half this gain has taken place in the course of the last few years, chiefly, I believe, owing to the Excise imposing duty on a certain proportion of spirits whether this is obtained or not. It would be absurd to suppose that he has yet reached perfection in his art, but difficult to make him believe this.

Experience tells us that fermentation in the materials of the dung heap is more tardy than in worts or wash, and less acetous acid is created, owing to the predominance of fibrous matter, and this containing more of those properties which induce these effects.

The following mechanical arrangements and process are, such as appear to me, likely to serve the purposes of consolidating and protecting the materials from the cow-houses and stables on a farm from the deteriorating influence of rain and air until the proper season for fermentation, immediately previous to the manure being applied to the land.

A shade must be formed on either side of the cow-houses and stables, as found most convenient, from twelve to fifteen feet wide, by means of light rafters, the upper ends of them resting on the wall of the buildings, and the other extremities on a plate placed on a range of posts at the distance above mentioned from the wall. This shade may be subdivided into three equal compartments by common draw rails, and there should be an opening in the wall opposite to each of these divisions, in order conveniently to throw the dung and litter into the shades, as also smaller apertures for the urine to pass. The stock should be occasionally penned in one or more of the spaces in the shade, according to the quantity of the materials and number of animals, for the purpose of trampling and consolidating them, and this operation must be commenced with the first removal of dung and litter. The floor of the shade may be of any firm retentive material, sloping from each side to the centre. There should be a well to receive what moisture may sink from the materials, by means of a gutter the whole length of the shade, and the liquid so received must be there, or in some other commodious place, mixed with moss or mould, so as to bring it to a consistency that will prevent fermentative action until the period for general fermentation, when this may be incorporated with what had been prepared in the shade, or otherwise reduced to a more fit or less pungent state by an admixture of such matter as may be found best adapted for the land to which it is to be applied.

When a certain quantity of materials shall be collected in the shade, these may be forked out and placed on a dry site, with a lair of moss or mould in the bottom to absorb the liquid; the heap to be made in a compact form, compressed, and rounded on the upper surface. Moss or mould should be put into the bottom of the shade, and this placed on the upper part of the heap when removed, with clay, marl, or turf on the upper surface of the whole, and rounded and beat down so as to exclude air and moisture from the interior. This operation of removing and covering up the materials may be performed monthly, or more frequently if thought advisable, and if possible in dry and cold weather. When this compost is to be fermented, it should be turned over, exposed to the atmosphere, and considerably moistened, and, when sufficiently reduced, deposited in the land as soon as possible.

When this last process is to be performed, in order to effect the measure of decomposition requisite with rapidity, dry straw introduced into different parts of the heap may he found to keep it sufficiently open for the admission of air; but it is not economical then to decompose this straw, which should be removed into the shade when the other materials shall be sufficiently reduced.

It might be found more convenient if the preceding directions were so far deviated from, as to separate the urine from the dung and litter, and to allow it to pass from the stock to a recess under cover, where it may be mixed with moss or mould as already described.

W. S.

## ON THE MANAGEMENT OF BELTS OF PLANTING.

WRITERS on planting complain generally of the closeness at which forest trees are allowed to stand in young plantations, and the complaint is frequently too well founded. In no instance is this more apparent than in what is usually termed strips or belts of planting; such plantations are intended for ornament or shelter, or both. Where they occur near the mansion, beauty of outline in the individual plant, is more an object than profit or utility in increased cubical contents of timber; but the gardener or forester to whose care this department is, or ought to be confided, often finds that he must sacrifice *future* to *present* appearances. A professional man will be at no loss to conceive how a plantation, under judicious management, or otherwise, may appear some ten, twenty, or thirty years hence, but he may find it very difficult to make the matter appear in the same light to another, whose knowledge of vegetable physiology may be more imperfect. A landed proprietor will say, You may destroy a horse; and I can replace another in his stead in a week, for thirty or forty guineas, but cut down these fine young trees and the same feature cannot be produced for ten or twenty years to come; and hence the closeness of a young plantation which is the certain precursor of debility in the stem, and of thin, straggling and stinted branches and foliage, produces an effect which it is intended to avoid. In the narrow belt where landscape effect is not contemplated *in the distances*, and where *masses of one kind of plant*, so conducive to beauty, variety, and utility in the forest, cannot be introduced, *mixture* may be, and generally is resorted to. This mixture often consists of Norway spruce, silver-fir, larches intended as nurses, with a random sprinkling of the common deciduous round-headed forest trees. During the first four or five years the plantation looks tolerably well, but by and by the branches begin to cross each other, and the leading shoots of many that ought ultimately to stand as reserves, are switched by the lateral branches of their overtopping nurses; they are nevertheless too frequently allowed to struggle on for other five or ten years. That favourite evergreen Norway spruce forms the most striking feature in the belt, and a more stiff and unsightly outline than it presents can scarcely be met with in the whole British forest scenery. If liberal thinning has not been resorted to in the early stages of the growth of the plantations, it will be no easy matter to allow each reserve to assume its natural form after it has struggled for existence, during the first ten or fifteen years after planting, and longer delay only increases the evil. Where plants have been drawn up weak from confinement, the bark will be thin and liable to bind by too speedy exposure to a free current of air, and in such a case much caution will be necessary in thinning, to allow the intended feeble reserves to acquire what Sir Henry Steuart calls the *protecting properties*; but these being once attained, and the plant furnished with a full clothing of lateral shoots, liberal thinning may be carried on with a safety proportioned to the state of the plants, and exposure of the situation in which the plantation stands. In the forest the final thinning may be deferred till between the twenty-fifth and thirtieth year from planting, because there, length and thickness of bole are the objects of desire. In the belt or the lawn, where natural forms are essential, and where judicious treatment has been observed, the ultimate thinning should take place about the fifteenth year of the plantation's age, allowing full space for every single tree to attain a moderate size, without its branches coming in contact with those of the neighbouring trees. This distance will of course vary with different trees, and on different soils; as a medium in both cases from fifteen to twenty-five feet from plant to plant will be rather within the proper limits.

In making selection of reserves, deference must be paid to the proprietor's taste; as a general rule, however, it should be observed, that where strips of planting run north and south, if larch or other aspiring trees are left to break the monotonous appearance of round-headed trees, they should stand near the *eastern* side of the strip; because in all narrow plantations such plants are made to lean eastward by the western breeze. Where, for the sake of equalizing the appearance of a belt, such trees may be wished to stand near the western side, their smothering effects to the eastward may be calculated on to the distance of thirty or forty feet, and in spaces thus [illegible] open, evergreens, such as Portugal laurel, should [illegible] as underwood

Near the side next to the principal point of view, some of the lower growing ornamental trees should either be left or introduced; amongst these, the Acer rubrum, Negundo fraxinifolia, Liriodendron tulipifera, Tilia alba, and others, would form an agreeable variety. In giving the final thinning it might, in many instances, be advisable to grub out the thinnings at the root, to prevent the formation of coppice, particularly near mansion-houses. The ground should be all regularly dug over, taking care not materially to injure the roots of the reserves, and about as many evergreen plants might with advantage be inserted as there were of reserves, and these in the openest spaces, where they also should be allowed to take their *natural form, branching close down to the ground.* It may be here remarked, that in planting laurels, and other evergreens, where trees are already established, and from whence many arboreous plants may have been recently removed, it will be necessary to make the pits *much larger* than will contain the roots of the plants to be inserted, that by loosening the neighbouring soil, their roots may the sooner shoot apace, and the plants acquire strength to enable them to extract their due proportion of nourishment from a soil, subjected to a heavy contribution, by a close netting of roots of various sorts of trees.

The thinning out and replanting underwood as above advised may be by many considered violent operations, and certainly the appearance for the first year or two will be something startling; but if the nurses are properly grubbed out, the ground dry and properly levelled, a judicious selection of plants made as to sorts, and of healthy appearance to stand as reserves, a sprinkling of evergreens as underwood, carefully and judiciously inserted, the ground dug, smoothed, and sown with the seeds of Poa nemoralis or other sylvatic grasses—the tree roots thus having a larger unobstructed range, the branches will become more vigorous, the foliage more richly luxuriant, and each tree and evergreen shrub assuming its natural form, will become a distinct and interesting object; and while the neglected close plantation is every year becoming opener below, till at last it presents a mass of bare maypoles, with a scanty and thin foliage at top, more likely to invite a free passage to the winds than to afford shelter, the plantation under proper treatment will exhibit reserves relieved from the

starving and smothering kindness of their nurses, and wil
evince their gratitude by throwing out vigorous lateral bra
The underwood will produce an immediate effect, and that
will annually increase in interest, until the under branches
forest trees shall mingle with those of the underwood, thu
tually producing picturesque effects and affording perma
that shelter for which the plantation was originally intend

In situations where narrow strips of planting are lai
for the purpose of shelter, together with the profitable re
of timber or coppice, length of bole will be encouraged by
but timely and judicious pruning, and coppice, to afford s
below, may be formed of oak, hazel, birch, mountain-ash,
mixture of all these, and as such coppice will require occa
cutting to preserve requisite closeness at bottom, half c
*breadth* of the belt should only be cut at one time, leavin
other half to afford shelter, and to be cut down in its turn.

In upland situations no plant offers more effective s
than the Scots fir, but if allowed to stand too close, no plan
be less effective. A safe rule of management may be to
the reserves at an early period of their growth, and these s
stand at from twenty to twenty five feet asunder, choosin
most vigorous plants, and allowing the *lower branches full*
removing the nurses regularly when their branches come
in two feet of the extremities of those of the plants int
to stand; observing this rule till all the nurses are di
ed, a beautiful mass of vegetation will be formed, *close*
*ground*, which may continue to afford shelter for a centu
come. The Scots fir becomes a most beautifully picturesqu
in a solitary state, and when not interfered with by the ha
man. When the manorial residence is in an exposed situ
this plant treated in the manner here recommended, either in
masses or narrow strips *with irregular outlines*, for the purp
shelter, will improve the climate, and impart considerable b
to the landscape.

A.

## ON ROT IN SHEEP.

In Vol. V., page 503, of this Journal is an article, entitled "*On water meadows causing Rot in Sheep.*" The very extraordinary circumstances detailed in that communication led me at first to think it an imaginary case, given to the public for the purpose of provoking discussion; as lawyers say, "a case stated for counsel's opinion." But, on farther consideration, I shall treat it as a real one.

The writer says, "About the year 1808, some land, part of which had been under water, much of which was a bog, and part of which was nearly dry, was drained, levelled, and irrigated. Although it was drained, and was so far dry that horses could at all times walk upon it, yet it produced coarse herbage, rushes, and even some flags. In this state it remained at least fifteen years, and during the whole of that time, it was constantly fed on by ewes and lambs in the spring, and no instance was ever known of any of these sheep ever shewing the slightest symptom of rot." To this part of the statement, I have to observe, that ewes and lambs are not liable to rot when pastured upon water meadows *in spring*. It would have been satisfactory to have been informed, whether sheep of any kind were *close-pastured* upon the meadow in its then partially improved state, either *in wet summers*, or *in autumn*?—and what was the result of such pasturage?

As the reader may not have the published statement to which I allude before him, I will here make a more copious extract from it;—to enable him the better to comprehend the comments I shall have occasion to make upon it. "As, however, the herbage was not good, and it was supposed that, by obtaining a better outfall, and a more effectual mode of drainage, the meadow might be much improved, it was broken up in 1829, drained more perfectly, better levelled, and was again laid down to grass after a turnip fallow. The land then appeared to be perfectly drained. The turnips were excellent, and the grass which was sown in 1831 was beautiful. It was mown that autumn, after having been irrigated, and produced abundantly. It carried great flocks of sheep the ensuing spring, and produced a very great crop of grass early in the summer, but afterwards, in that year, the land appeared starved, and the grass did not come a second time to the scythe.

"In the spring of 1833, the meadow yielded a good pasture to the sheep, but, except in those parts which were dry and steep, it produced little for the scythe. Rushes made their appearance, and as it was probable that the land was not sufficiently drained, more drains were made, which produced a great deal of water. Then for the first time suspicions were raised that the sheep fed on the land were tainted by the rot, and it has been ascertained that, since Christmas 1833, sheep fed upon it have taken the rot in five days. In the spring of 1834 more drains were made in it. The consequence of which has been a great improvement in the quality and quantity of the herbage, but as far as the rot is concerned, it has been equally fatal to every sheep put upon it. It is necessary to add, that although the whole of the meadow is now so well drained, that, after a fortnight's irrigation, it will become so dry in a week, as to admit horses galloping over it without scarcely leaving the print of their shoes; yet as some parts of it are much lower, and consequently much nearer the water by some feet than others, it might be supposed that they would be more likely to produce the rot than those parts which are higher. But this is not the case. It has been ascertained that they are all equally infectious. Other meadows in this neighbourhood, irrigated partly by the same stream, have equally rotted the sheep though perfectly well drained. As those other meadows are entirely new, it cannot be said of them, that there was a time when, though less well drained, they did not rot the sheep. They do not affect the question, *What can be the reason why land which, when less well drained, was fed by sheep with impunity, rots them now, when it is much better drained?*"

This negative question appears to me, as if put for a similar purpose to that of the witty King Charles, in regard to the weight of live and dead salmon, and in answer, I will apply the sentiment expressed by one of the sages on that occasion, "Before I assign a reason, I could wish to prove the fact." On entering upon this discussion, it is but fair to acknowledge I do so under a considerable degree of prejudice; because, I have experience of many instances of low marshy grass land when in a state of nature, or but partially improved, rotting the sheep pastured upon it; and that land, on being subsequently thoroughly drained or connected into well ordered water meadows, did not rot sheep fed upon it in proper season. But I will endeavour to shew, from the querist's own statement, it is probable that he has come to an erroneous conclusion in estimating the capability of his water meadow.

1. *The System of Irrigation.*—The most proper method of irrigating low marshy ground, such as the meadow described, is the bed or ridge system. It is not probable the meadow in question was so formed, because, if it had, the occupier would not have ploughed it up, cultivated it, and cropped it with turnips, as the re-formation of these beds with water-carriers and furrow drains, would have been attended with an unnecessary additional expense, of from L. 10 to L. 20 per acre. Indeed, it appears certain, the meadow was not so formed, as he says, " The grass seeds were sown in 1831. They were mown in the autumn of that year *after having been irrigated.*" Now, if water had been thrown over new formed beds of loose cultivated earth, a great part of it would have been washed away, and the young grass plants along with it. Neither is it probable his watering was done upon the catch-work principle, as that is not applicable to flat marshy land, such as a great part of the said meadow is described to be; and a loose formation of catch-work is still more liable to be guttered, and the earth washed away, than beds so formed. I am, therefore, led to believe the irrigation in question was something of the nature of warping, and effected by a rivulet dammed up, and the water from it caused to flow over the meadow at random, or with but little artificial direction; and although ewes and lambs may do well when pastured *in spring* upon land so managed, or rather mismanaged, yet sheep of any sort *close pastured* upon it *in wet summers* or *in autumn*, would hardly escape rot, and that, without any reference to whether the land was well or ill drained. The great advantages derived from the bed formations and catch-work systems of irrigation, is the rapid flow of water over the surface, and quick delivery of it by the receivers and furrow drains, either to supply other beds at lower levels or convey it to the waste water chan-

nels, no water ever being allowed to stagnate upon any part of a well ordered meadow. That desirable object cannot possibly be attained in warped or flooded meadows, however much they may be drained, and hence the liability of such meadows to rot sheep.

2. *The Quality of the Herbage.*—We are informed the land was sown with grass seeds in the spring after the turnip crop, and that it was irrigated in the same year the seeds were sown, but the varieties of those seeds are not mentioned. If they were annuals or biennials, such as are commonly used in agriculture, they would of course soon die off, and all the tender and most nutritious of the natural grasses would be extirpated by the aration processes; while the roots of coarse grasses and other pernicious plants, so far from being eradicated, would in fact be renovated by the short course of arable culture. Indeed, it is purposely acknowledged, "rushes again made their appearance in the second year after the seeds were sown," and probably many other still more objectionable plants made their appearance at the same time. But, even supposing the land had been sown with a proper selection of perennial grasses, these would have been weak in the second year. The narrator complains of his grass looking "*starved* after mowing in the second year, and that it did not come a second time to the scythe;"—also, in the third year after sowing, he says, "except in those parts which were dry and steep, it produced little for the scythe;"—the more valuable plants raised from seeds sown upon the low land being gone, and supplanted by pernicious plants as before stated. The sound pasturage on the meadow would be confined to a very narrow compass, and hence rot without any reference whatever to draining.

3. *The Manner of Pasturing.*—We are told that before the meadow was improved otherwise than by irrigation, it did not rot ewes and lambs pastured upon it *in spring*. But, it is not said it was at that time sound pasturage for sheep *in wet summers* or *in autumn*. Neither is it said that *after draining* it rotted ewes and lambs *in spring*. It is, however, stated that after the third draining in the spring of 1834, "the meadow was equally fatal to every sheep put upon it." There is no mention of *the time of the year* when the sheep were so put, nor is it stated

whether the land was *full stocked with sheep* in that fatal pasturage. I, however, think that calamity took place *last autumn*, at least it is fair to infer so, because, as the third draining was effected in the spring of last year, the irrigation could not be carried on while the draining was in hand, consequently too late to produce early spring food; and if the meadow was mown for hay last summer, the fatal result will have arisen from the sheep eating the autumnal lattermath or fog, and not from the land having been more perfectly drained.

Much more matter of a similar purport might be stated in support of my argument, but I trust I have already said sufficient to shew that the querist has come to a hasty conclusion in supposing, as he states his case, " that land when less well drained may be fed by sheep with impunity, and rot them when much better drained." * I will therefore dismiss this part of the subject, and add a few practical remarks on that destructive malady

### *The Rot in Sheep.*

Great diversity of opinion exists as to *the cause* of the rot in sheep, but it is generally admitted that *the effect* is an accumulation of flukes on the liver. Some readers may not understand the term " flukes" as here applied, though it is not entirely a local term. I will therefore explain it. On a post-mortem examination of a rotten sheep, a great many small animals, of whatever denomination those creatures may be, are found seated upon the liver; having, without doubt, accelerated the death of the animal. These creatures are called flukes, or flounders, from being shaped something like the fish so named, though they are formed more like turbot than plaise, as they are nearly circular. They vary in size; I have never seen any larger than a man's thumb-nail. They are generally found in the arteries of the gall-bladder; and, in extreme cases, they are also found in abscesses formed on the liver. These creatures move and collapse when first exposed to the air, but soon after die. A question naturally arises, though not easily answered in a satisfactory manner, How come those destructive creatures to be seated upon sheep's livers? and, Are they found upon all sheep's livers, whether diseased or not? I do not assert they are found upon the liver of every sheep, but I certainly have frequently seen them, though in small numbers, in the gall-bladder or arteries upon the livers of perfectly sound fat sheep slaughtered by the butcher; but I never saw abscesses and flukes in them upon the livers of such sheep. I have been informed by butchers, that they have found flukes on the livers of fat pigs which they had slaughtered, and I have no reason to doubt that statement. May it not be that flukes, to a limited extent, are placed upon the livers of sheep for a certain purpose in the order of nature, and that they increase in extraordinary numbers when the animal is diseased from other causes, as insects of various sorts multiply upon diseased subjects both in the animal and vegetable creation? If that supposition be admitted, it would then appear flukes on the liver, in an excessive degree, are more *the effect* than *the cause* of the disease called "rot in sheep." But it has been asserted, and is generally credited by farmers, that flukes on sheep's livers are the sole cause of rot, and that these creatures are not naturally inhabitants of the liver, but originate from eggs or spawn deposited by some insects upon grass growing in marshy places, and taken up by sheep with their food. I do not give a decided opinion upon this theory, whether well or ill founded. It is possible it may be correct, for although food and other matter which the sheep pick up passes into the stomach in the first instance, and apparently does not come into contact with the liver, yet, as there is a communication from the liver and gall-bladder to the stomach, for he purpose of conveying matter necessary to promote digestion, he embryo of the fluke insect may ascend by that channel from the stomach to the liver. It may then be said "insects whose natural element is in the air or upon the earth, will not live in the interior of animals." One instance to the contrary, well known to farmers, will suffice to answer that objection. That is the case of the bot-fly. That insect so deposites its eggs, hat maggots are bred from them in the entrails of horses. These maggots afterwards pass into their chrysalis state, and ultimately become flies. Such is the order of nature in that case and in many others, and why not in regard to the fluke insect? It is probable the natural history of the fluke insect has been ascertained, though I am not acquainted with it; but that is of minor importance to the practical farmer; his objects are, to know how to prevent his sheep taking rot, and how to cure them when affected with it. To these desirable objects my attention will now be directed, and although I have no new theory to promulgate, yet as the observations I shall make on the subject are derived from extensive practice and many years' experience, they may prove interesting, if not useful, to some practical men into whose hands this essay may fall.

---

* We believe it to be truth that should grass be pastured by sheep after being irrigated in *winter* no rot will ensue, in so far as the irrigation is concerned; but that grass produced *after summer* irrigation will cause the rot in sheep, how well soever the land may have been previously drained.—EDITOR.

I need not describe the symptoms of rot in sheep; these are unfortunately but too generally known to flock masters and shepherds. It does not necessarily follow, as some persons have imagined, that all sheep tainted with rot die of that disease; on the contrary, very many tainted sheep, *when properly treated*, afterwards become so far sound as to fatten well and be not only profitable to the owner, but their mutton of a good colour and wholesome to the consumer; so much so, that it is impossible for any person, from seeing and tasting the mutton, to decide whether the sheep had ever been tainted with rot. In curing the rot, I do not think it advisable to trust to the effect of medicine alone. I have made use of the customary remedies of turpentine, vitriol, nitre, ginger, &c. and have derived some benefit from these medicines, but only to a very limited extent as compared with a change of pasture. I consider it of the greatest importance, on the first symptom of rot in the flock, to give the whole, wherever practical, an immediate change of pasture, and that of a quality such as I shall describe in a case of my own. I several times had different lots of store wedder sheep bought in, in spring, for the purpose of summer grazing. These sheep had been bred and reared upon waste land fed *in common*. They appeared sound when purchased, but afterwards I had reason to believe they were tainted with rot. I gave them no medicine whatever, but turned them into a dry, hilly, well-sheltered old-grass pasture, where they had a wide range and abundant choice of food, the pasture not having been generally stocked with sheep, and not close eaten by other stock. These sheep throve well, and made themselves prime fat in the course of the summer. They returned a good profit on their grazing, and, when slaughtered, proved to the butcher's entire satisfaction. Their mutton was firm, and of a fine bright colour. As they were slaughtered in the neighbourhood, I had frequent opportunities of inspecting their livers, and made it a point of doing so at every favourable opportunity. My anticipation of their having been tainted with rot proved well founded. In every case that came under my observation, I found the liver much reduced in size, the lobes of some quite wasted away. Numerous abscesses had been formed on most of the livers, but they were all healed and cicatrized, and the remains of the livers were firm to the touch, and had a healthy appearance. I found flukes in the gall-bladder arteries, but not in greater numbers than I have seen on the livers of other fat sheep not tainted with rot. It is to be observed these instances were not confined to sheep drawn from the same flock, or to one particular season. The results were, as I have stated, upon sheep drawn from various flocks, and in different years. It is also proper to mention, I had no particular loss in those sheep, not more than the customary casualties in grazing sheep. It is true comparatively few farmers and graziers have such favourable opportunities of changing their sheep's pasture as I had in the instances I have here mentioned; but it is in the power of all to stock their land lightly, and it is generally admitted that over-stocking land with sheep is one principal cause of their contracting rot. Sheep are taught by instinct to reject unwholesome food, nor will they resort to it otherwise than when pinched by over-pasturage, or confined in situations where they have no other resource. It is a *sound* maxim in grazing, '*rather under-stock than over-stock land.*" There are many instances of farmers who, having for a series of years kept a limited number of sheep upon their lands without rot in their flocks, and who, afterwards, on increasing their stock beyond a due proportion, sustained serious loss by that disease; and again, on their reducing their flocks to their original standard, the rot ceased. Such instances were not confined to low-lying swampy land; similar results have been experienced from like management upon dry hilly land; for, even in such situations, there are always some swampy places producing unwholesome herbage, to which sheep resort when pinched of better food. I will mention a particular instance of this. A farmer whose farm consisted, in part, of a considerable extent of arable land, and adjoining to it a dry hilly sheep pasture, which he stocked rather hard. In a hollow place of that pasture was a swampy pond, which was preserved in that state for the purpose of supplying the water-wheel of the thrashing machine. The farmer had occasional losses from rot in his flock. He fenced in the pond, and prevented the sheep having access to the coarse herbage which grew on its verge, and then the rot entirely ceased.

Great precaution should be taken, particularly in *wet summers* and *in autumn*, when sheep are pastured upon low-lying cold clay, thin skinned land. Such land should never be close pastured with sheep, nor should they ever be close confined either upon such land or upon any other description which is not inaptly called "rotting land," that includes warped, flooded, and marshy land generally. When sheep are necessarily pastured upon such land, they should always have access, at pleasure, to healthy sound land adjoining, which they will naturally select for a night lair, and for pasturage in unseasonable weather. Sheep are liable to contract colds when compelled to lie upon damp unwholesome ground in wet seasons; also from autumnal fogs, when confined to such situations; and, colds so contracted, not unfrequently terminate in rot.

Sheep are not so subject to rot upon the high bleak mountains in the north, as upon the fertile plains in the south of the island. This has been fully exemplified of late years, and may be accounted for by the hills in the north being seldom overstocked; the sheep upon them have wide ranges of pasturage, and instinct teaches them to select proper food and a dry lair. While in the south, the land being more valuable, is divided into smaller occupations, is generally closer fed, and the sheep being confined in narrower limits, have not so great a variety in choice of food, and of lair suitable to change of wind and weather. Shelter they more generally have in the south than in the north, but that shelter frequently confines them in a damp, foggy, pestilential air.

The writer of the essay which has caused this discussion in speaking of his meadow, says, "It has been ascertained that sheep fed upon it since Christmas 1833, have taken the rot in *five days.*" I have heard it said sheep have been known to take the rot from pasturing upon rotting land only *a few hours*, and that may be the case, for sheep, when hungry, on being turned into fresh pasture, feed voraciously, and without discrimination in the selection of their food; they are then liable to pick up unwholesome even poisonous herbage; and if the fluke theory which I have mentioned holds good, they would also be liable to pick up the embryo of that destructive insect.

Salt is a good condiment for sheep, and they eat it with avidity when accustomed to it. Hence, marshes occasionally overflowed by the sea, or as they are called "salt marshes," are not so liable to rot sheep, as land warped or flooded by fresh water It may be that salt destroys the embryo of the fluke insect, or prevents its deposition on the grass. It no doubt is a corrective to unwholesome food.

When a few sheep only are pastured along with other stock upon dangerous land, they are not so liable to take rot as when such land is close pastured by sheep alone, because the few have a greater choice of food suitable for them. For that reason, it is advisable to pasture *in autumn* with mixed stock in preference to sheep alone, water meadows, warped or flooded land, and all other descriptions of dangerous land. And, most assuredly, *the lighter such land is pastured with sheep at improper seasons, the less danger of rot.* To conclude, it may be said in this case, as in most others,—prevention is better than cure. And I do believe rot in sheep may, in very many cases, I do not say in all be prevented by due care and attention in the grazier or shepherd. The means of prevention which I have here pointed out are not infallible, but assuredly such persons as adopt these precautionary measures will find it their interest in so doing.

F. B.

## CANADA AND THE ILLINOIS.

*A Tour through North America; together with a Comprehensive View of the Canadas and United States, as adapted for Agricultural Emigrants.* By PATRICK SHIRREFF, Farmer, Mungoswells, East Lothian. Edinburgh, Oliver and Boyd. 1835.

If the "reading public" of Great Britain be not well acquainted with the Canadas and United States of America, their ignorance cannot be attributed to the want of books which have issued from the press within these few years on those interesting countries. On the contrary, the great number of "tourists and travellers," who have favoured the public with their sentiments on that portion of the globe, form quite an era in our literature.

From the war of independence to the end of the general war, Great Britain and the United States kept aloof from each other. They looked on one another in sullen silence. Not so much as a billet or a bullet passed between them. All that Britain knew was, that the United States had established themselves into a republic, and had no established religion. She chuckled with mischievous satisfaction at the Yankee sayings of Jonathan, when any of them happened by chance to be wafted across the Atlantic; and was verily shocked at some of the rough amusements of the Back Settlers; but she cared little to learn the state of the agriculture of that country, its manners and customs, its society, and general government. During the same period, Canada was an impenetrable forest, bound round with a mantle of snow, and Niagara thundered its "crush of waters" far beyond the reach of European ear.

The short brush preceding the peace, and the piping times of peace itself, have *changé tout cela*. The noble estuaries, spacious harbours, and thriving cities of the young republic, attracted admiration even from our hostile forces, and excited astonishment that so young a nation should have advanced so rapidly in improvement. These same harbours and cities have now become familiar to us, through the uninterrupted intercourse of commerce. The two countries are now the greatest *entrepôts* of barter in the world. The agricultural productions of the

States, flour, tobacco, cotton, and rice, are now bartered for the manufactural industry of Britain. The interests of both are now so involved in the continuance of this commercial interchange, that at least for many years to come, until their interests take a different turn, there is not the least probability of a rupture again recurring betwixt them. A similar happy change has been effected on our colonies in the Canadas, through this pleasing understanding with the States. The deep solitude of the Lake of Erie was indeed for a time converted into a "sea of troubles," so as the sound of strife re-echoed through forests, which had before only reverberated to the report of the Indian rifle; but this conflict of warfare disclosed a country, courting the hand of the agriculturist to render her forest-clad soil as prolific of corn as it had been of timber; and so rapid has since been the change, that now the comforts, if not the luxuries, of life may be obtained, "where a few short years ago the foot of man, except a hunter, had never trod."

Mr Shirreff, author of the Tour mentioned at the head of this article, is a farmer in East Lothian, and went to America with the express intention of inquiring whether the Canadas and the United States are countries suitable to agricultural emigrants in general, and, in particular, which of them should be preferred by his brother to settle in. The result of his inquiry is, that the United States are preferable to a settler to either of the Canadas,—that the Illinois is the preferable portion of the States,—and that Upper Canada is preferable to Lower. So that one of the first writers on America, Mr Birkbeck, as well as the last, Mr Shirreff, agree that the Illinois is the best country for emigrants, either for speedy individual ease and comfort, or pecuniary emolument. There is no doubt that prairie land can be more easily converted into arable cultivation than forest land, and particularly among such gigantic trees as obstruct the process of clearance in Upper Canada. The prairies are also situated at a lower latitude, where climate should greatly assist and meliorate the labours of the husbandman. But notwithstanding of these natural advantages of the prairie over forest land, which are obvious to every agriculturist, we think that the opinions of Mr Shirreff in regard to the Illinois should be received with the caution, as of those of a prejudiced man; for it is evident, from the tenor of his remarks on the nature of government, that his partialities decidedly lean to republicanism. His notions, too, of manners, whether national or domestic, and of what the constitution of civilized society should be, savour strongly of a desire for equality of ranks and privileges, or an apparently affected sympathy for what appears to him to be a degradation of the labouring classes. He is sensitively affected on seeing a waiting wench stand erect while he is eating his mutton. As to Mr Birkbeck, his motive for praising the Illinois obviously sprung from a desire to dispose of his property and quit that country. It is a circumstance not unworthy of a remark, that, anxious as Mr Shirreff always seems to criticise the opinions of Mrs Trollope, Mr Hamilton, Mr Stewart, and Mr Fergusson, he never once takes notice of Mr Birkbeck, and his speculations in the Illinois.

Mr Shirreff's Tour is divided into two portions; the first comprising a narrative of his personal adventures, and the other of agricultural intelligence. The last portion is the only valuable part of the volume. It contains many judicious and practical observations on the nature and quality of soil, the nature and value of its productions, the privations which all emigrants must encounter at the outset of their undertaking, and particularly those who pretend to purchase land without ready money, and promise to redeem part of its fee simple by the returns of profit. It is humanity to condemn such conduct, if the condemnation of it would deter persons embarking in so ruinous a scheme; and yet, rather inconsistently we think, Mr Shirreff finds fault with the Government, Land Companies, and individuals in Upper Canada, for selling their forest land too dear, for no other reason, apparently, than because it is dearer than the same kind of land in the States. That there are too many unnecessary and vexatious delays in locating new settlers in Canada at their first outset is certain; but surely the dearer forest land is held, it will be the most effectual method of placing it beyond the reach of people who have no capital. It would not be too dear for capitalists, were even three times its present value demanded for it.

We have not space to follow Mr Shirreff into all his minute details; but we cannot allow him to say, without remark, that

Mr Fergusson has misrepresented Canada to the people of this country, especially as this Journal was the means by which Mr Fergusson chose to give publicity to his opinions; and which opinions have earned for him no small share of public favour. Mr Fergusson we know to be incapable of wilfully misrepresenting any thing; and as to misrepresenting Canada, we have heard him repeatedly state to those who sought his counsel, and they were neither few nor unimportant, that he had never, and never would state any thing, but what he could set his face to. His regard for Canada is ardent and sincere. It is a country suited to his taste; and feeling thus warmly towards it, he is justifiable in expressing his own opinions strongly. That many persons may have formed too high an opinion of Canada, before leaving this country, is very probable. We are apt to be sanguine, where we think our interests are to be improved.

Indeed, the facts mentioned by Mr Shirreff himself, of having met with emigrants who were plunged at once into misery, by purchasing land without ready capital, are proofs that they were the victims of self-delusion. Mr Fergusson's invariable maxim has been, that " no man need go to Canada as a settler without capital; and as a labourer, without the resolution to be sober and industrious; but with these any man will there *get on*, which, in too many cases, he cannot do in this country." It is quite a mistake to suppose that the Highland Society patronised Mr Fergusson, or vouched for any of his opinions regarding Canada. Indeed, they uniformly decline the responsibility of the facts and opinions of their correspondents. Having been long a most efficient Director of that Society, they were very naturally anxious that Mr Fergusson, on his return from his Transatlantic excursion, should publish his remarks on that new and interesting country. But Mr Shirreff's wrath is reserved for Mr Fergusson's statement of the probable return from 200 acres of Nichol, in four years when clearing 150 acres. We have no doubt that Mr Fergusson had very good grounds for that statement. We are much mistaken if something very like what is stated at the beginning of it, did not actually occur last year on Nichol. " The *chief error*" in the statement, says Mr Shirreff, " consists in clearing land, sowing it with wheat, and reaping the crop in the first year, which is an *impossibility*. The [illegible] error is repeated in the fourth year. Thus four, instead of three crops, are reaped in the time specified."

Mr Shirreff does not condescend to inform us wherein the application of that statement is *impossible:* he merely objects to some of its details, which do not materially affect its results. The cost of clearing being L.4 per acre, and wages a dollar a-day, eighteen men would clear an acre a-day. The *impossibility* of the thing would therefore solely depend on the want of hands; for as to clearing ground of trees by chopping, sowing wheat among the stumps, without ploughing, and only harrowing, and reaping the crop within the agricultural year, is a feat which any farmer could easily perform. How does Mr Scott in East Lothian trench 100 acres of ground, sow wheat, and reap the crop within the year? Is chopping trees more laborious and expensive than trenching ground?

In reference to a letter which appeared in this Journal from Mr Sommerville, of the township of Whitby in Upper Canada, Mr Shirreff informs us, that it was published in this Journal without his knowledge; a very likely circumstance. All that we can say on the subject is, that we came honestly by the letter from Mr Sommerville's friends; and judging from some paragraphs in it, strictly of a private nature, which were not published, we were led to the conclusion, that it was his wish to have the contents of it made as public as possible. Why Mr Sommerville should be irresponsible for sentiments when made public, which he freely avowed in private by letter, Mr Shirreff does not deign to instruct us.

Had Mr Shirreff confined his observations strictly to agricultural matters, his book would have proved a useful instructor to the agricultural emigrant, and an agreeable companion to the general reader. In his attempts to assume the novel characters of a narrator of personal incident and a man of science, he has signally failed.

As an instance or two of scientific inaccuracy we may mention that the trees in Upper Canada termed red cedars by Mr Shirreff are the *arbor vitæ;* the beautiful climbing plant *Celastrus scandens*, the staff-tree, is called *Celestina scandens.* The luxuriant shoots of the alder are represented to die down every year. The alder is only a shrubby tree in Upper Canada, but as these shoots may be seen eleven and twelve feet high, surely they are more than of one year's growth. True larches are only seen in damp situations in Upper Canada. Mr Shirreff mentions having seen the papaw and, we think, the guava. The papaw, *Carica pyriformis*, is a stove-plant in this country, and is a native of Peru, and the rest of the species of that genus belong to Guinea, the Carraccas, and the Indies. The guava, *Psidium*, is also a stove-plant and a native of the tropics. Such plants as these would be quite unable to withstand a Canadian winter, during which our common evergreens, as lauristinas and laurel bays, are kept as greenhouse plants.

Mr Shirreff complains bitterly of the nauseousness of the butter at Goderich. A little research would have discovered to him that about Goderich, in the spring, great quantities of garlick abound. On the plant dying down soon after, the butter becomes as good as can be desired.

His character as a narrator of personal incident we shall give as we find it described in the 164th number of that amusing miscellany Chambers' Edinburgh Journal.

> "At the first look of this goodly-sized octavo we felt disappointed, and this sentiment was not diminished on perusing the contents. Two-thirds of the volume consist of trivial observations on the traveller's personal adventures in hotels, stage-coaches, and steam-boats. He tells us the name of the driver of the coach which brought him from Haddington to Edinburgh; lets us know where he breakfasted and stopped on his route to Liverpool; and wearies us with similar minutiæ through the whole of his tour. The world is now quite tired of books of this kind upon America. Who cares a farthing where a traveller got his breakfast, or whether he wore a white or a black hat on his journey, or whether the said hat was a worn-out silk nap or a beaver, or whether he slept well or ill one night at a particular hotel? Yet the principal part of Mr Shirreff's book consists of this sort of matter, which it is clear can be of no use to the public, and only serves to enhance the price of the work."

Nor is he more successful as a political economist. Take this as a sample of his political science:—

> "The corn laws have been denominated a bread-tax, but they ought to be named rent laws, as their practical effect has been to raise the rent of land without benefiting any one engaged in agriculture, except a few farmers, during an existing lease. They are a tax on the community, for the benefit of landholders, so admirably devised that it is levied without expense, farmers acting as gratis collectors, and paying the proceeds in the name of rent. Corn laws have long given a fictitious value to farm produce, and created delusive hopes in farmers, which led to their own ruin. At present they are injurious to the agricultural labourer and farmer, because, while they continue, and are subject to change, rational data for renting land and investing capital in its cultivation cannot exist."

Corn laws have existed in this kingdom for upwards of 200 years. According to this mode of reasoning, or rather assertion, rent, one hundred years ago, must have borne the same relative proportion to the value of labour and agricultural produce as it does now. Is that the fact? It would puzzle an honest, unsophisticated farmer to discover how *he* collects a certain tax, called the corn laws, and makes up part of his rent with it!

## EXCRETION OF PLANTS.

In the last number of this Journal there are some remarks on the excretory *theory* of plants, as a correspondent is pleased to term it. I consider the excretory *powers* of plants, or the *excretion* of plants, more proper expressions, and think it rather unfair to class those who believe in the experiments of M. Macaire and M. de Candolle, with new theorists, and men of the laboratory. Is Mr Towers, the experienced gardener, to be considered only as a theorist, or only as "experienced in the laboratory?"

But it particularly ill becomes my opponent thus to speak, who, in four octavo pages, indulges in speculations on light, heat, moisture, electricity, and, more especially, on the different functions of the roots of plants. Were I inclined to enter upon this last speculation, I would rather suppose that the horizontal fibres give out, because I find by ploughing deep I get quit of the excrementitious matter, and thus have better crops, than by continuing to sow in the defiled ground; but as the vertical and horizontal roots have the same structure, I believe the truth to be, that they have the same functions. I am, indeed, sorry to find any one, with the farming experience and general knowledge that your correspondent seems to have, attempting to chill those who are inquiring into this very interesting subject; and I do regret if I have been the means, by any thing I have written, of calling forth the present opposition; but I am willing to hope that it is only to the way in which I have stated the case that your correspondent is opposed, for if it is generally known to be a fact, that leaves give out a noxious gas, why should any be unwilling to believe, after the experiments which have been made, that the roots of plants give out also? But let us leave theory, and attend to the facts of your correspondent. He states, that he has known barley and oats raised in the same lands for twenty years in succession. I, too, have known something similar to this: but surely every farmer must allow that this is an exception to the general rule, and might, I have no doubt, be accounted for in every case; but at present I am willing to class this amongst "the few and ill observed facts," although it does not require much stretch of imagination to believe that the excrementitious matter is decomposed by the fermentation of the dung applied. Indeed, if any one was to bring against me even the opinion of the great agriculturist Tull, that wheat may be raised for ever on the same land, without any manure, I would call on them to remember, that he also argued that tillage supplied the place of manure; so by frequently turning up and stirring the soil, the exudation may be decomposed by some of the means mentioned by your correspondent, viz. light, heat, or electricity, or may be washed away by moisture.

But now I would attend to your correspondent's facts or remarks concerning the sugar-cane and Guinea-grass, which I do the more willingly as I was in Jamaica for several years, and during the most of that time took an active charge of a sugar estate, on which there were above 400 Negroes.

First, then, as to the grass chiefly cultivated in the West Indies, viz. *Panicum maximum*, better known by the name of Guinea-grass. There is no doubt but what it has remained for a very considerable time in some lands; but here seldom is it allowed to ripen seed. How few proprietors have a sufficiency of it to allow them to do so even if they were inclined; and when it is permitted to ripen seed, *does the plant die?* When in Jamaica I allowed my grass to ripen seed the first year that it was put in the ground, that it might thus be increased; but I rarely, if ever, afterwards allowed it to advance so far, having always had occasion to feed it with the cattle, or cut for the folds. For what reason your correspondent brought forward this plant against my views I know not. Did he intend to compare it with barley or oats? He ought rather to have likened it to *Holcus avenaceus*, like Brown, or to cocksfoot, some other *perennial* grass.

But, secondly, as to the sugar-cane. I have no doubt that your correspondent's informant is correct, when he states that land in the West Indies has given annually two tons of sugar, and as much rum, without any manure for half a century. But what are the characteristics and habits of the plant from which this great return has been had? The simple fact of its living for half a century, shews how different it is from wheat or barley. Why, I do thank your correspondent for calling my attention to the sugar-cane, for, if I was to fix on one plant to support my views, it would be that plant. I am very certain it must be the old Creole cane, to which your correspondent alludes, which was for a long time the only kind cultivated in our West India Colonies. This kind of cane seldom flowers in Jamaica to any extent; and as to ripening seed, I have attempted to raise plants from the dust of it, but did not succeed; and Hughes, in his Natural History of Barbadoes, says, that when the whitish dust is sown, it does not vegetate: but even when this cane does flower, and the flower-stalk (or arrow, as the Negroes call it) is allowed to decay and drop, the plant does not wither or die, like oats or barley, but shoots forth fresh from the eyes of the cane. Things, however, are very much altered in Jamaica; few, I am afraid, can now boast of their canes fifty years old, for, on an evil day, another cane was introduced into cultivation, called the Bourbon or Otaheité cane, which is more productive at first, but it is much more apt to flower, and from this or some other cause is much shorter lived than the old cane, requiring to be replanted in most parts of Jamaica every third or fourth year, with a very heavy dunging; and a piece of fresh ground is always preferred by those who can get it. Now, I hope my readers are prepared to agree with me that the "characteristics and habits" of the sugar-cane and guinea-grass are *not* "opposed to the doctrines in question." I have shewn something of their characteristics and habits, at all events, that they are not annuals; and my opponent has given in italics my doctrine, viz. that it is only when plants are forming, or ripening their seed, or *dying*, that exudation takes place to any extent, or *such as to render the soil again unfit for carrying the same crop to advantage.* I lately observed the following in the Companion to the Useful Knowledge Almanack for 1829, page 39, "We do not mean to assert generally, indeed, that all plants are avoided by animals when in flower or seed; but when the remark is limited to *annuals and biennials* it will hold almost universally (mark that); not even snails and slugs, those indiscriminate devourers, will in this case touch a leaf." Now what I wish some experimenter to ascertain is, whether the roots do not lose their sweetness at this time, as well as the leaves, and if the exudation is then most noxious. In my first article on this subject, vol. iv. p. 880, *dying* was the word on which I put emphasis, and marked by italics; and, in truth, my opponent's remarks have only tended to strengthen me in my opinion, and I hope I may have convinced him also, that annuals or dying plants injure land so that they cannot be raised to advantage for a succession of years in the same soil, whilst perennials, like the cane, may give for half a century a great quantity of the "richest vegetable matter in nature, without any manure." Yes, there is something in death which we little attend to, and little understand; but this we know, that by the wisdom and through the kindness of our God, out of death comes life; but it is another kind of life, even as by the crucifixion of the flesh there is spiritual life, so in the vegetable worl the death of one plant is life to another of a different kind; and, in the animal world does not the worm or maggot appear?

I ought, perhaps, to bring forward trees in favour of my views, but it might be argued that trees, by extending their roots, are constantly reaching fresh soil; however, I would draw from every source, as I hope we have yet much to learn on this interesting subject; so I would call on hedgers, when a large gap takes place in a hedge, to keep in mind the exudation of plants. I also would request foresters to give us any information they possess as to the death of old Scotch firs, and replanting the land with firs.*

There is one small tree, however, that I cannot resist mentioning, viz. the orange tree at Versailles, which goes by the name of the Old Bourbon, and which is said to be about 700 years old, during which time it has been kept in a tub or box. I recollect asking the gardener how often the soil had been changed, and the impression left upon my mind is that that was not thought to be necessary. The vine is also well worthy of the attention of those who are inclined to consider further this subject; it is another plant which gives a quantity of the richest vegetable matter in nature, and that too without manure, but only tillage; not but that manure increases the quantity of fruit, but a great quantity of fruit may be had without manure. A most respectable well-informed wine-merchant informs me, that he knows a vineyard which, before 1802, gave excellent wine, but a new proprietor dunged it that year, and the wine became so bad that, even in 1815, it was unsaleable, although that was in general such a fine vintage. What I wish to argue is, that vines do not defile ground like oats or other annuals; and although they are planted in general, according to Miller, from five to ten feet apart, they thrive in some situations for above 300 years, and that most vineyards are mending until they are fifty years old; whereas clover, according to the same authority, when it has been often repeated, will seldom continue above two years, and very often not above *one*, and although manure will increase the crop it will not prolong the stay of the plant. Having been induced again to notice this subject, I hope that, although I have been led away to France and the Tropics, I have been enabled to make myself intelligible to practical farming readers; and if I have been fortunate enough to carry them along with me, I hope they will now understand the propriety of sowing no annual rye-grass, and of cutting both their hay and grain crops early. I would also take this opportunity of informing my readers who are near large towns, that, instead of having barley and oats with alternate rye-grass, they would find it more profitable to have no rye-grass; if their land is in breaks of fours, they might have oats, potatoes, or turnips, barley, and then red clover, with a sprinkling of white, but no grass seeds. To those who have a five-shift course, I would recommend, instead of the red clover, to sow two-thirds of white clover and one-third of yellow,* adding some rib-grass; to be fed for two seasons with sheep. I would add a little yarrow, considering it a most wholesome plant for sheep, but some may object to this on account of its having running roots. I met lately with a *successful* farmer from the north of England who follows this system, and gets great crops. He had heard of the exudation of plants by their roots, but evidently had not given the subject much thought; and it was not from the laboratory but through the field, that he was taught not to cultivate in succession, plants so near akin as oats and rye-grass. He, in the rotation of fours, sows only red clover, but I have added a little white, as red is more precarious; and, for the same reason, I add in the five course rib-grass and yarrow, also believing that the variety is good for sheep. The farmer should keep in remembrance that a change from barley to rye-grass (of the annual sort at least), is as little a change as from barley to oats or wheat.

---

* This subject has been partially treated of in vol. v. p. 541. of this Journal. Editor.

---

* The yellow-clover is a wiry worthless plant.—EDITOR

Mr Young compared, in Kent, wheat which followed beans, clover, tares, and fallow; the first was superior to all the rest, and the worst was after the fallow. My readers may draw what conclusions they please from this, but it seems to me that the wheat received some benefit from the exudation of the plants which preceded. I would, however, caution them, that wheat does not always succeed well after beans in the field, although it does in the laboratory, (as M. Macaire has proved by his valuable experiments); the truth is, that, in mild seasons, a slug remains after the beans which injures the wheat crop, but this may be in general corrected by lime. I shall now only add, that I shall indeed be sorry if what I have written should be the means of deceiving any one; but as I honestly believe that the consideration of the subject is likely to lead to a better or more profitable rotation of crops, I have willingly contributed my mite; and I leave it to others to decide to whom your correspondent's quotation from Herschel is most applicable.

S. W.

---

## ON THE CONNEXION OF THE PHYSICAL SCIENCES.

*On the Connexion of the Physical Sciences.* By Mary Somerville. Second Edition. London: John Murray, Albemarle Street. 1835.

In the course of the last few years, the number and variety of works on science which have been published in this country, exceed those of any former period. It is true, that most of them are limited in their views, and popular in their pretensions;

and what effect such a system will finally have on our scientific character cannot easily be foreseen. Popular science is, no doubt, to a certain class of the community, entertaining, and may occasionally be useful; but we suspect that the infancy of science is often mistaken for its maturity, and that to talk plausibly on any subject, too frequently passes for a profound, or at least a sound, knowledge of it. Under these circumstances, visionary speculators, imagining that they have made important discoveries of new properties in various departments of mechanical and physical science, inveigle incautious friends to embark in speculations that too often terminate in the ruin of both. To render even discoveries available for practical purposes, a considerable portion of accurate science is absolutely necessary. If requisite, we may fortify our opinion by a name of some authority. Sir John Herschel, in his Treatise on Astronomy, p. 5, § 7, says,—

> "After all, we must distinctly caution such of our readers as may commence and terminate their astronomical studies with the present work (though of such, at least in the latter predicament, we trust the number will be few), that its utmost pretension is to place them on the threshold of this particular wing of the temple of science, or rather on an eminence exterior to it, whence they may obtain something like a general notion of its structure; or, at most, to give those who may wish to enter a ground-plan of its accesses, and put them in possession of the pass-word. Admission to its sanctuary, and to the privileges of a votary, is only to be gained by one means,—*a sound and sufficient knowledge of mathematics, the great instrument of all exact inquiry, without which no man can ever make such advances in this or any other of the higher departments of science, as can entitle him to form an independent opinion on any subject of discussion within their range.* It is not without an effort that those who possess this knowledge can communicate on such subjects with those who do not, and adapt their language and illustrations to the necessities of such an intercourse. Propositions which to the one are almost identical, are theorems of import and difficulty to the other; nor is their evidence presented in the same way to the mind of each."

So true, indeed, are the preceding remarks, that, for want of mathematical science, it is well known that some of those who have made very numerous experiments and discoveries in physical optics, have failed to produce a single formula to guide the practical optician in the construction of either achromatic or reflecting telescopes, and without which their labours are in a great measure lost to the scientific world.

The author of the present work is a striking example of the reverse of this. In early life, comparatively, she discovered a taste for mathematical science, and prosecuted a study, by many reckoned both dry and severe, with great success, under her private tutors in this city, when popular science was not the order of the day, and in consequence has risen to such eminence, that her Mechanism of the Heavens is almost the only book on physical astronomy in the English language worth consulting on that sublime subject. The admirable introduction which she wrote to this work met with such general approbation, and gave so satisfactory and interesting a view of astronomy, that many who had read it, we believe, expressed a desire to see it extended, and illustrated with diagrams and notes, and she was induced to undertake the present work on that basis.

The work now referred to, however, was confined to astronomy alone, but the present treatise, though written in a more popular style, is extended to the greater part of the physical sciences, including a pretty full tract on astronomical phenomena in the first thirteen sections,—the author occasionally introducing topics more or less connected with that subject throughout the volume. The variety of matter renders it difficult to examine minutely in our prescribed limits all the subjects treated with so much ability in this work, and therefore we shall confine our remarks chiefly to such matters as appear to us likely to interest generally the readers of this Journal. These, we believe, are chiefly the articles Climate, the Influence of Heat on Vegetation, and the Distribution of Plants.

" Much has been done," says our author, p. 276, " within a few years, to ascertain the manner in which heat is distributed over the surface of our planet, and the variations of climate, which in a general view mean every change of the atmosphere, such as of temperature, humidity, variations of barometric pressure, purity of air, the serenity of the heavens, the effects of winds, and electric tension. Temperature depends upon the property which all bodies possess, more or less, of perpetually absorbing and emitting or radiating heat.

" When the interchange is equal, the temperature of a body remains the same; but when the radiation exceeds the absorption, it becomes colder, and *vice versa*. In order to determine the distribution of heat over the surface of the earth, it is necessary to find a standard by which the temperature in different latitudes may be compared. For that purpose it is requisite to ascertain by experiment the mean temperature of the day, of the month, and of the year, at as many places as possible throughout the earth. The annual average temperature may be found by adding the mean temperatures of all the months in the year, and dividing the sum by twelve. The average of ten or fifteen years will give it with tolerable accuracy; for although the temperature in any place may be subject to very great variations, yet it never deviates more than a few degrees from its mean state, which consequently offers a good standard of comparison.

"If climate depended solely upon the heat of the sun, all places having the same latitude would have the same mean annual temperature.

"In fact, if the globe were everywhere on a level with the surface of the sea, and of uniform substance so as to absorb and radiate heat equally, the mean heat of the sun would be regularly distributed over its surface in zones of equal annual temperature parallel to the equator, from which it would decrease to each pole as the *square* of the cosine of the latitude; and its quantity would only depend upon the altitudes of the sun and atmospheric currents. The distribution of heat, however, in the same parallel, is very irregular in all latitudes except between the tropics, where the isothermal lines (lines of equal heat), or the lines passing through places of equal mean annual temperature, are more nearly parallel to the equator. The causes of disturbance are very numerous, such as the elevation of the continents, the distribution of land and water over the surface of the globe, exposing different absorbing and radiating powers, as forests, sandy deserts, snow-covered mountain-chains, the reverberation of the sun's rays in valleys, the interchange of currents of air, water, and the influence of cultivation."

It is said, page 279, that "temperature does not vary so much with latitude as with the height above the sea; and that the *decrease is more rapid in the higher strata of the atmosphere than in the lower*, because they are farther removed from the radiation of the earth, and being highly rarefied, the heat is diffused through a larger space. A portion of air at the surface of the earth, whose temperature is 70° of Fahrenheit, if carried to the height of two miles and a half, would expand so much that its temperature would be reduced 50°; and in the ethereal regions, the temperature is 90° below the point of congelation."

It appears to us, that the first and last parts of the preceding paragraph are inconsistent and contradictory. "The opinion," says Sir James Ivory, London Philosophical Magazine, vol. lxvi. page 86, "that the decrements of heat are more rapid the higher we ascend in the atmosphere, which Professor Leslie has adopted, was no doubt suggested by his formula, from which it follows as a necessary consequence; but the experimental investigation of the formula itself is merely an ingenious chimera, which leads to an inexact result." Now, it appears to us that Mrs Somerville has incautiously adopted this erroneous conclusion, adopted by Professor Leslie and Dr Young. It is added, that "Professor Playfair, who had no system to support, adopts an opinion, with regard to the gradation of heat, quite opposite to that of Professor Leslie. It is curious that both of them draw their conclusions from the same observations of Saussure on Mont Blanc." See Outlines of Natural Philosophy, vol. i. Now, we find generally, that if a great height in feet or yards, for example, be divided by the difference of degrees of temperature, such as Chimborazo, the quotient is much greater than if from a smaller height. Indeed, the experiments on Chimborazo give about 400 feet for 1° Fahrenheit, while those on small heights, not exceeding two or three thousand feet, give about 200 feet, or one-half of the former. In fact, if the ethereal regions have a temperature of 90° below the freezing point, it ought to be expected that this state would be approached gradually. We think, too, that the latitude particularly, if high, has, contrary to the opinion expressed here by our author, great effect, as was found by Captains Sabine and Foster, when they measured a hill barometrically at Spitzbergen, in latitude about 80° N., where, by a mean of twenty-six sets of observations, the writer of these remarks found that a height of 1600 feet produced no sensible effect on the thermometer; and how much more might have been required, it is impossible to say. From these remarks, it will appear, we think, that Mrs Somerville has been misled, by adopting, without due consideration, the peculiar notions of the late Professor Leslie.

"The gradual decrease of temperature," says our author, "from the equator to the poles, is clearly indicated by *its influence on vegetation*. In the valleys of the Torrid Zone, where the mean annual temperature is very high, and where there is abundance of moisture, nature adorns the soil with all the luxuriance of perpetual summer. The palm, the bombax ceiba, and a variety of magnificent trees, tower to the height of 150 or 200 feet above the banana, the bamboo, the arborescent fern, and numberless other tropical productions. But the richness of vegetation gradually diminishes with the temperature; the splendour of the tropical forest is succeeded by the regions of the olive and vine; these again yield to the verdant meadows of more temperate climes; then follow the birch and the pine, which probably owe their existence in very high latitudes more to the warmth of the soil than to that of the air. But even these become stunted dwarfish shrubs, till a verdant carpet of mosses and lichens, enamelled with flowers, exhibits the last signs of vegetable life during the short but fervent summers at the polar regions. Such is the effect of cold on the vegetable kingdom, that the number of species growing under the line whose latitude is 0°, and in the northern latitudes of 45° and 68°, are in the proportion of the numbers 12, 4, and 1. Notwithstanding the remarkable difference between a tropical and a polar Flora, moisture, combined with a little soil, seems to be almost the only ingredients requisite for vegetation, since neither heat, cold, nor even darkness, destroys entirely the fertility of nature.

"In salt plains and sandy deserts alone, hopeless barrenness chiefly prevails. Plants grow on the borders of hot springs—they form the oases of the desert wherever moisture exists, even among the burning sands of Africa,—they are found in caverns void of light, though generally blanched and feeble. The ocean again teems with vegetation. The snow itself not only produces a red algæ, discovered by Saussure in the frozen declivities of the Alps, and by the polar navigators in the Arctic regions, but it affords shelter to the productions of these inhospitable climes against the piercing winds that sweep over fields of everlasting ice. Those northern navigators relate, that, under this cold defence plants spring up, dissolve the snow a few inches round their position, and the portion of snow above them being again quickly frozen into a transparent sheet of ice, admits the sun's rays through it like the artificial glass covering of our greenhouses, which warm and cherish the plants in this natural hot-house, till the returning summer heat removes it, and renders such protection unnecessary.

"By far the greater part of the hundred and ten thousand known species are indigenous in equinoctial America; Europe contains about half the number; Asia, with its islands, somewhat less than Europe; New Holland, with the islands in the Pacific, still less; and in Africa there are fewer vegetable productions than in any part of the globe of equal extent. In the equatorial regions, where the heat is always great, the distribution of plants depends chiefly upon the mean annual temperature, whereas in temperate zones, the distribution is regulated considerably by the summer heat. Some plants require a gentle warmth of long continuance, others flourish most where the extremes of heat and cold are greater. The range of wheat, for example, is very great: it may be successfully cultivated as far north as the 60th degree of latitude, but in the torrid zone it will seldom form an ear below an elevation of 4500 feet above the level of the sea, from the exuberance of its vegetation, nor will it ripen above the height of 10,800 feet, though much depends upon local circumstances. In the Deccan in India, Colonel Sykes states, that wheat thrives 1800 feet above the level of the sea. With regard to vegetation, elevation is equivalent to latitude as far as temperature is concerned.

"In ascending the mountains of the torrid zone the richness of the tropical vegetation diminishes with the height; a succession of plants, similar, though not identical with those found in latitudes of corresponding mean temperature, takes place; the lofty forests by degrees lose their splendour, stunted shrubs succeed, till at last the progress of the lichen is checked by eternal snow. On the volcanic peak of Teneriffe there are five successive zones, each producing a distinct race of plants. The first is the region of vines, the next that of laurels, these again are followed by the districts of pines, of mountain-broom and grass, the whole thus covering the peak, extending to a perpendicular height of 11,200 feet.

"Near the equator the oak flourishes at the height of 9200 feet above the level of the sea, and among the Himalaya range, the rhodiola rosea on heights as great as Mount Blanc (about 15,600 feet) has been found identical with the species that blooms in Scotland."

It may be remarked, that islands partake of the vegetation of the neighbouring continents when the distance is not great, but when remote from land their floras are altogether peculiar. These results deserve the attentive consideration of the agriculturist. By a careful consideration of the nature of the soil, its elevation and position, local and geographical, some idea may be formed of the nature and value of its productions.

If these had been properly considered, so many attempts to raise peculiar crops in unfavourable situations would not have been attempted, and the ruin of speculators in such hopeless projects could not have occurred. Whether any scientific method of ascertaining by investigation the proper crops calculated for certain situations of known latitude and height above the sea will ultimately be discovered, we are not now sufficiently qualified to determine, though we see no reason to despair. These speculations, however, must be reserved for some future consideration, and we shall terminate these remarks by recommending this particular work of the distinguished author, warmly to the attention of the public in general, and to the admirers of extraordinary female merit in particular.

---

## MISCELLANEOUS NOTICES.

I. *The Rohan Potato, a new variety.*—The following is an extract from a letter written from Geneva, of date 25th April 1834, by Prince Charles de Rohan to M. Jacquemot-Bonnefont, Nurseryman, Annoney, in the Ardèche.

"I send you, through my friend M. Romilly, the potato which I promised you; and to which my name has been given in this country. The history of this potato is not less singular than the potato itself. He who obtained it from seed four years ago shews it, but will not give it to any person: he has refused it to King William. He has cultivated it in a little walled inclosure: he only wishes to see it in perfection, and the seed of the following year. He makes them to be taken up in his presence; keeps them under lock and key, and to be cooked for himself and cattle before his face. It is at great risk that I have been able to procure two tubers. This exclusive amateur having learnt that I had got some *cactuses*, which he wished much to have, begged me to give him some. I wished no money, but very much to have some of his wonderful potato. He gave me two of them, and made me give my word of honour that I would never send any of them to Holland, Belgium England Prussia, or Germany. Happily he has not thought of Switzerland nor France; for without this omission, I could not have had the pleasure of offering these to you.

"This is the mode of cultivating this potato:—The earth is dug to the depth of twenty inches; make the distance between the holes four feet, and put two or three eyes, or sets in each hole. Earth up frequently. The stalks, reaching six or seven feet in height, must be supported on transverse stakes. The kind being late, the tubers, which are very farinaceous, should only be taken up about Martinmas, when the stalks wither.

"To give you an idea of the extraordinary produce of this potato, I give three examples at random. M. E. Martial, at Alais, gathered last autumn tubers weighing 13 lb. 7 oz., 11 lb. 9 oz., and 9 lb. 13 oz. M. de Montet, a proprietor near me, asked me for tubers when I could not give him more than a single small tuber having four eyes. He weighed it for curiosity, and found that it wanted a few grains to make half an ounce. However, this small tuber being planted, produced 48¼ lb. The Attorney of the Abbey of Auterive, canton of Fribourg, to whom I had given two tubers two years ago, and who, delighted with his first harvest, after having eaten and given some to his friends, planted the rest, and obtained last autumn six double-horse loads and eight scuttle-fulls. It is not the largest tubers which succeed best as seed."—*Le Cultivateur, Journal des Progrès Agricoles. Jan.* 1835.

II. *Kyan's Infallible Cure for the Dry-rot.*—We earnestly entreat the attention of our readers in general, and particularly that of ship-builders, housewrights, and proprietors of large timber plantations, to the following extracts from the *John Bull* newspaper, of date the 29th March and 5th April 1835, who has paid the most laudable attention to this most important subject, detailing the advantages of the simple, but efficacious, method discovered by Mr Kyan for the preservation of timber under every circumstance.—*Editor Q. J. A.*

"Our readers may remember that some months ago we brought to their notice a discovery which appeared to us to be of the greatest value and importance to society generally, and most especially to the Government, and for which a patent has been obtained. This discovery, and its success, have since become more celebrated; and time having afforded the most satisfactory and unquestionable proofs of its efficacy, we feel it a duty which we owe to the country, again to call attention to the subject.

"The discovery to which we allude is that of a certain and infallible cure for dry-rot; the leading facts connected with which, and its results, are so concisely embodied in the following petition of the patentee, Mr Kyan, that we think we cannot do better than submit it to our readers, reserving to ourselves the privilege of adding a few words, by way of illustration, which we think will induce those who are really patrons of science and lovers of economy, to give it their support when it shall be brought forward in a more regular manner.

"'To the Honourable the Commons of the United Kingdom of Great Britain and Ireland, in Parliament assembled: The humble Petition of John Howard Kyan, of Furnival's-inn, in the City of London;

"'*Sheweth,*—That your petitioner having discovered a cheap and effectual process, whereby timber can be completely preserved from dry-rot and decay; and, having made application, trials were instituted *by order of the Navy Board*, on the 9th of June 1828, and continued, *under the direction of the Admiralty*, for a period of five years, to the 9th July 1833.

" 'That the result of these trials has proved more satisfactory, although they were not conducted, in many respects, according to the mode suggested by your petitioner, nor in the manner best calculated to elicit the value of the invention.

" 'That all other trials made by various disinterested parties have corroborated the fact, that the object of your petitioner's invention is fully attained by his process.

" 'That the process of your petitioner being equally applicable to canvass and cordage, trials were made on those substances, in his Majesty's Dock-yard at Woolwich, in September 1832; *the results of which perfectly established the invention to be completely efficacious* as a preservative of those substances, and which can be corroborated by the official reports of the officers of the yard.

" 'That your petitioner having, *at the suggestion of the Admiralty*, taken out patents for his invention, the process has been adopted by the Commissioners of Woods and Forests, and also very generally by the public, under the sanction of the first men of science, and architects.

" '*That your petitioner apprehends the numerous failures of previous plans have excited an unreasonable prejudice, and have produced an unwillingness on the part of the Admiralty to take upon themselves the responsibility of the adoption of your petitioner's process, although it is of itself inexpensive, and perfectly easy of application.*

" 'That the adoption of your petitioner's process for the service of the navy, would save the country an annual expenditure of many hundred thousand pounds, proveable from various facts, among which he respectfully adverts to the following:—

" '1*st*, That the process of your petitioner not only effectually preserves timber from the *dry rot* and *decay*, but it also has the effect of immediately *seasoning* the timber, by which it is rendered fit for instant use; thereby superseding the necessity of keeping a five years' stock of timber in his Majesty's Dock-yards, as is now the practice. In case of the adoption of your petitioner's process, it would be only necessary to keep in his Majesty's Dock-yards one year's consumption of timber; therefore, there would be no necessity to purchase any timber for the next four years, and the country would not only save such enormous sums for outlay in timber for four years, but likewise *the interest* on the large amount which is now sunk in maintaining a seasoning a stock of timber equal to five years' consumption in his Majesty's Dock-yards; which *interest* is an indirect but positive addition to the charge to the country in the Navy Estimates.

" '2*d*, That the process of your petitioner would prevent the great expense of *repairs* in his Majesty's navy; for if ships were built of timber, and rigged with canvass and cordage, prepared by his process, they would be preserved from every decay but the wear and tear of time, and the casualties of active service. To demonstrate the great saving to the country, by obviating the necessity of repairs from dry rot, your petitioner refers to the Navy Estimates laid on the table of your Honourable House, which prove that, from the year 1800 to 1820, the amount of such repairs was, to the expense of building, as *four* to *seven*; the annual average estimate during that period for *building* being L. 936.078, and for *such repairs*, L. 551,860; and if to the amount of these repairs is added the charge for other repairs, under the head of '*ordinary wear and tear*,' it will be seen that the charge for *all repairs* approximates very closely to the charge for *building*. In the Navy Estimates, to which your petitioner refers, it will be found that, from the year 1800 to 1820, the charge for repairs was L. 11,037,188, and for ordinary wear and tear L. 6,412,592, making the total charge for *repairs* L. 17.449,780; being an annual average of L. 872,489: and the charge for building was only L. 18,721,551, being an annual average, as before stated, L. 936,078. Therefore, your petitioner has every reason to believe, that if his process were immediately adopted in his Majesty's Dock-yards, the charge on the Navy Estimates for any other repairs but those from '*ordinary wear and tear*,' would at once be considerably diminished, and in a very short period totally cease.

"'*3d*, That, besides the great reduction of the Navy Estimates, by the application of your petitioner's process to timber, &c. for the use of his Majesty's navy, there are other numerous sources whereby large sums would be annually saved to the country by the general adoption of your petitioner's invention in his Majesty's Dock-yards and elsewhere.

"'*4th*, That the process of your petitioner, besides being the cause of great diminution of expense, is of the highest importance and value to the British navy and to the country at large—from the fact that Canada timber, by his process, is rendered as serviceable for all naval purposes as the best Baltic timber; and likewise all timber of British growth is rendered durable, and applicable to all domestic purposes. Therefore, exclusive of any economy, by the substitution in his Majesty's Dock-yards of Canada for Memel timber, the process of your petitioner will give Great Britain resources in her own colonies, and render her completely independent of foreign countries for supplies to keep up that navy which has been her pride and glory for ages.

"'Your petitioner, therefore, humbly prays your Honourable House to take the premises into consideration, and that an immediate inquiry may be instituted as to the experiments which have already been made, and their results, with a view to the adoption of your petitioner's process for the timber, canvass, and cordage, used in the navy, where its services would be more essential, and its economy more evident, than in any other department: Or, that your Honourable House will afford your petitioner such further and other relief in the premises, as to your Honourable House shall seem meet, and the justice of the case may require.

"'And your petitioner shall ever pray, &c.'

"Upon this petition we have only to remark, that, as far as the entire success of the discovery is to be implied by the opinions of individuals of the highest character, practically expressed in their private capacity, the best judgment may be formed from the fact, that Sir James Graham, the late First Lord of the Admiralty, and Earl De Grey, the present First Lord of the Admiralty, have adopted it for all purposes where timber is employed on their own estates; that Sir Robert Smirke has employed it in the building of the King's College; that Mr Wilkins has adopted it in the National Gallery; that Messers Brunel and Cubitt invariably adopt it; that the Commissioners of Woods and Forests have adopted it; and that it is also adopted in all the warehouses which have recently been built in London, at Bristol and Liverpool, as well as in the new improvements in the City; and that in all cases it has been so adopted after the most complete proofs of its efficacy have been afforded.

"An attempt has been made to question the salubrity of the process, and to excite a doubt as to the propriety of using it in ships, on board of which the crews are necessarily confined for long periods. But this attempt has been most signally defeated by the testimonies of Professor Faraday, Professor Brande, and Dr Birkbeck, who have shewn to demonstration the perfect absurdity of such malevolent insinuations.

"The process by which the dry-rot is actually prevented, is saturation of the timber in a solution of corrosive sublimate. Corrosive sublimate has an affinity for albuminous matter beyond all other substances whatever; in the act of combining it loses one volume of chlorine, so that, from a *per*-chloride of mercury it becomes a *proto*-chloride, which truly unites with the albumen. It is, consequently, not the *chlorine* which has the effect of totally arresting the energetic powers of decomposition usually exercised by albuminous matter, on the application of heat or moisture. Timber immersed in the solution, obtains and retains an increase of gravity in an exact ratio with its contraction or shrinkage, which renders it perfectly seasoned in a few weeks, instead of years, with the additional advantage that no deterioration has been occasioned in its strength, which inevitably occurs in the old system of dry seasoning by time and exposure to air.

"With respect to the salubrity, Dr Birkbeck, in lecturing upon the subject, said, 'that he would state a fact which appeared to him to silence all casuistical objections to the application of Mr Kyan's process to the British Navy, as well as to every other class of vessels. In August 1834, a ship of 420 tons, the *Samuel Enderby*, was built at Cowes, in which every timber, sail, and rope was prepared according to Mr Kyan's process. During the *building* of the vessel, the shipwrights were unusually healthy, unequivocally proving that no volatilization takes place from the timber: for, if such were the case, it would occur immediately after immersion in the solution, and be perceivable by persons engaged in building the vessel. This ship, however, came round from Cowes to London to be fitted for the South Sea fishery; and after three months of the hot weather, so remarkable last autumn, the bilge-water in her hold was found to be perfectly sweet,—a circumstance of unprecedented occurrence,—a quantity of which was afterwards taken to the Admiralty by Captain Gipps, R. N., as a proof of the groundlessness of the suspicion of the unwholesomeness of the process. Accounts of the continued purity of the bilge-water, and the consequent purity of the atmosphere in the same ship, together with the excellent health of the crew, have been received from the master six degrees south of the Line.

"Testimonials to the success of the process are every day increasing. Recent letters from Mr Farrel, architect, of Dublin; from Mr Butler, clerk of the works at the Westminster new Bridewell; from Messrs Harris and Warner, of Southwark; and from Mr Richards, of Wellington Street, all tend to establish the value of the discovery; and we do sincerely hope that no obstacles will be thrown in the way of the introduction into the navy of a plan by which the country would be so extensively benefited, and which has, as we have already stated, met the entire approbation of the principal members of two successive Boards of Admiralty, as their own individual adoption of it most incontestibly proves."

"We have received the following letter on the subject of Mr Kyan's patent, to which we last week called the attention of our readers. Mr Burn, it will be seen, states that 'he does not write with a view to publication,' but we do not consider that observation as prohibiting us from availing ourselves of so valuable a testimony in favour of a discovery which we firmly believe likely to conduce to the national welfare in an eminent degree. Mr Burn will perceive that we have omitted the only paragraph of his letter which contained any thing of a private nature, and we trust he will not be offended with the course we have taken the liberty of adopting.

"'TO JOHN BULL.

"'131 *George Street, Edinburgh, March* 31. 1836.

"'SIR,—I am induced to address this communication to you, from having just read, in your paper of the 29th inst., the petition of Mr Kyan relative to his process for the prevention of dry rot in timber, and your very just and proper remarks on the same; and as the discovery is likely to be attended with results far more important than it is possible now to calculate upon, there cannot, in my opinion, be a more important service conferred on the country than giving publicity to so invaluable a discovery, and recommending its adoption to every purpose for which it can be beneficially used.

"'To the numerous objects referred to in the petition, and in your observations, the application of this process must be invaluable, but it is likely to produce no less important results in many districts of this country, where home-grown timber is abundant, but inapplicable to the general purposes of buildings, from its liability to worm and decay; and as the expense of carriage from the seaports to many of these inland portions of the country has powerfully operated against the general introduction of Baltic timber, and consequently retarded the progress of improvement, it is both gratifying and satisfactory to find, that by so simple and economical a process, not only can the home timber be made available for every useful purpose, but the barrier to improvement (in the shape of expense attending the introduction of foreign timber) be entirely suspended, and every possible facility afforded towards the construction of every class and description of buildings.

"'The great advantage of this discovery, is the durable character it gives to every kind of timber, and in a country where the habitations of the lower classes are of a very inferior description, and farm offices not much better, and mainly attributable to the perishable nature of the home and expense of foreign timber, it is scarcely possible to overrate the advantage that may now be derived by the tenants on the one hand, or the proprietors on the other; the one being provided with the means of obtaining accommodation and comfort, and the other saved that heavy portion of the expense which so materially contributed to retard their improvements.

"'So entirely do I coincide in opinion with the respected individuals referred to in your remarks, that I have for some time past used Mr Kyan's process at every building under my charge; and so fully convinced am I of its efficacy and importance, that I have recommended the construction of tanks upon many of the largest estates in Scotland, and in course of a month I believe that from ten to twenty may be in operation for the exclusive use of home-grown timber, to be applied to the general purposes of the properties on which they are to be erected, and which will not only save a vast annual expense, but enable the parties to execute and complete many operations which, but for Mr Kyan's discovery, never could have been undertaken.

"'From the interest that you have taken from the first in this important subject, I very willingly afford you my humble testimony in favour of Mr Kyan's high claims to public support. I do not write this letter with a view to publication, but merely for the purpose of submitting to your notice the value I attach to this important discovery, that you may (should you think it proper in any subsequent remarks) refer to the manifold advantages likely to attend its introduction into the midland districts of such a country as Scotland, and to its adoption in the many instances I have alluded to, recommended and carried into effect by myself.—I am, Sir, your faithful and obedient servant,

WILLIAM BURN.'"

III. *Sunshine and Shade.*—A manufacturer of carmine, who was aware of the superiority of the French colour, went to Lyons for the purpose of improving his process, and bargained with the most celebrated manufacturer in that city for the acquisition of his secret, for which he was to pay L. 1000. He was shown all the process, and saw a beautiful colour produced; but he found not the least difference in the French mode of fabrication, and that which had been constantly adopted by himself. He appealed to his instructor, and insisted that he must have concealed something. The man assured him that he had not, and invited him to see the process a second time. He minutely examined the water and the materials, which were in every respect similar to his own; and then, very much surprised, said, "I have lost my labour and my money, for the air of England does not permit us to make good carmine." "Stay," said the Frenchman, "don't deceive yourself,—what kind of weather is it now?" "A bright sunny day," replied the Englishman. "And such are the days," said the Frenchman, "on which I make my colour. Were I to attempt to manufacture it on a dark or cloudy day, my results would be the same as yours: let me advise you, my friend, always to make carmine on bright sunny days." "I will," rejoined the Englishman, "but I fear I shall make very little in London!"—*Sir H. Davy.*

IV. *The Water of the Nile.*—The water of Egypt (says the Abbe Mascrier) is so delicious, that one would not wish the heat should be less, nor to be delivered from the sensation of thirst. The Turks find it so exquisitely charming, that they excite themselves to drink of it by eating salt. It is a common saying among them, that, if Mohammed had drunk of it, he would have begged God not to have died, that he might always have done it. When the [illegible] undertake the pilgrimage of Mecca, or go out of their country on any other account, they speak of nothing but the pleasure they shall find at their return, in drinking the Nile water. There is nothing to be compared to this satisfaction; it surpasses in their esteem that of seeing their relations again, and their families. All those who have tasted this water, allow that they never met with the like in any other place. When a person drinks of it for the first time, it seems difficult to believe that it is not a water prepared by art. It has something in it so inexpressibly agreeable and pleasing to the taste, that it deserves that rank among waters that Champagne has among wines. But its most valuable quality is, that it is exceedingly salutary. It never incommodes, let it be drunk in what quantity it may; this is so true, that it is no uncommon thing to see some persons drink three buckets of it in a day, without inconvenience! It is right to observe, that the water of the Nile is that which is alone intended in these high encomiums. Well-water in Egypt is detestable and unwholesome. Fountains are so rare, that they are a kind of prodigy in that country. Rain-water it would be vain to attempt preserving, as scarcely any falls in Egypt. How peculiarly forcible and expressive are the words of Moses to Pharaoh. "The Egyptians shall *loathe* to drink of the water of the river:" That water in which they so much delighted,—that which they preferred to all other water in the world, and to which they had been so long accustomed, should become so hateful, that they would turn away from it in disdain, and instead of it drink well-water, which, in their country, is, of all other kinds of water, the most detestable!—*Harmer's Observations.*

---

## QUARTERLY AGRICULTURAL REPORT.

May 1835.

The open and mild weather of the winter continued to the end of March. Since then the air has felt sharp and frosty, accompanied with an unusual tract of northerly and north-westerly wind, which at times blew with violence. Notwithstanding occasional showers of snow which lay for a time on the hills, the spring has been more than usually dry, so much so that complaints have arisen in many parts of the country from want of water to work thrashing mills. Vegetation is considerably later, perhaps a fortnight, than last spring. Yet every species of plant looks well. The wheat, both autumn and winter, is neither too backward nor forward; too thick nor too thin; that after the potato *looking* the worst. The spring crop of beans, peas, oats, and barley have been deposited in a fine dry bed, and the braird, in consequence, came up strong and equal. We hear, however, that oats are suffering in some parts by the grub. The young grasses stock the lands well. March is the most trying time in this country for young grass and wheat; but, as little frost and sunshine appeared then, they have fortunately escaped being thrown out. Turnips have left no remuneration, the prices of cattle and sheep having declined till very lately, and we would fain persuade ourselves they will recover their former standard. The very low price of potatoes, of which immense quantities are now raised, have induced feeders to give them to cattle.

This has been a favourable lambing season, with the exception of some partial snow storms which overtook the ewes on the hills. There is every probability of wool maintaining good prices. It affords us pleasure to observe, that an annual wool-fair is to be instituted in Perth, for the convenience of the central wool-growing districts in Scotland. Such a fair has been much wanted, since wool became a staple produce of this country. This year the fair is to be held on Tuesday 7th July, two days before the great wool fair at Inverness. We hope the English wool-staplers will countenance it, as it will be the means of saving them much trouble in finding out those who have lots to dispose of, and of establishing prices.

The prices of grain have not fluctuated much. Though all low, barley has borne the best price. It will be observed from our tables, that the average price of wheat in Edinburgh has exceeded that of London. We would conclude, from this circumstance, that the Scotch wheat is of better quality than the English. The weekly average of wheat in London, on the 8th of May, was only 38/6; at the same period 9th May, in 1834, the average was 48/4, the balance against the present year being 9/10 per quarter.

We apprehend there is yet a good deal of wheat in the farmers' hands. We do not remember, for many years past, so luxuriant a display of blossom on every species of fruit-bearing plant, from the lowly strawberry to the lordly peach. Some of it in exposed situations has no doubt suffered from the severe frosty nights, and particularly that of the 14th May; but if a tenth part of the blossom mature into fruit, the crop must be immense.

The prospect of the farmer is not, in our opinion, so encouraging as it was last year at this time. The value of live-stock, his main stay, has much declined, and in a declining or unsteady market, dealers are unwilling to embark in large speculations. We observe that the English farmers, as a forlorn hope, have set their hearts on a repeal of the malt-tax. This is the only subject of a general nature which affects agriculture that has been taken up by the Legislature;—the English tithe bill,—the county rate charges,—the weights and measures amendment bill, all having got the go-by for this season.

As we are anxious to inform our English friends of the opinion expressed in Scotland of the repeal of the malt-tax, as it would affect agriculture, we shall dwell a little at length on that subject. That the repeal of the entire malt duty of 20/8 per quarter, would or should benefit the *consumer of malt liquor and spirits*, we believe it in common with every body. It would reduce the price of malt liquor and spirits, and improve them both in quality. Strong ale, such as is brewed in Edinburgh for L. 7 per hogshead of 28 dozen of bottles, at 5d. per bottle, would be reduced one penny, or to L. 5, 12. Small beer, such as is retailed at a-penny a bottle, would not be reduced to the consumer, the brewer and retailer dividing the duty among them. Spirits from malt would be reduced 1/3½ per gallon, 16 gallons being the quantity required by law from a quarter of malt. The 10/ and 12/ per gallon of malt spirits could then be sold for 8/8¼ and 10/8¼ per gallon. There would probably be no difference in spirits distilled from raw grain, although a small quantity of malt is usually mixed with the grain.

The *brewer* would benefit also to a certain extent, the inducement to use raw grain in the manufacture of beer and ale being then withdrawn. We believe all the draught ale, and some of the bottled, used in the coffee-houses of this country, are partly made from raw grain; they are deleterious beverages. Were the malt-duty taken off, the beer and ale would be brewed entirely from malt. Their improved quality, in connexion with the cheaper price of the latter, would cause more of both to be consumed. We frequently see what we consider a very unfair statement of what the reduction on beer should be by the total repeal of the malt-tax. The tax is compared with the price of barley, and the reduction of the price of beer is demanded according *to their proportion*, thereby allowing nothing for making the malt and beer, and the profits of the maltster and brewer, all of which must first be allowed before the consumer has access to the beer.

The *distiller* would also derive a benefit. He would relinquish the distillation of spirits from raw grain, and distil only from malt. The quality of spirits would thus be improved, and its consumption increase among the higher orders. The repeal would have the effect of equalizing the prices of spirits. We cannot believe, however, that the quality of malt liquor and spirits will be improved so much as they ought. Some raw grain, we fear, would still be used to make drinks suitable to the tastes of the lowest drinkers, and even should more malt be used, it would be made from inferior barley, and afford no better spirit than superior raw grain.

The *maltster* would benefit by the change. He would be entirely relieved from the vexatious surveillance of the excise; and he could then dispose of his capital in the fitting up of his vessels and premises as he chose. He would, indeed, have numerous competitors in those householders who made their own malt, but his would be established as a separate trade, many of the brewers and distillers, and private individuals, becoming his customers.

The *householder* would benefit by the repeal. He could make his own malt and brew his own beer, and have it as strong or as weak as he chose. The Scotch not being a beer drinking nation, would not avail themselves much of such advantages. They would take a bottle of beer, or a glass of ale, as they do now, when it comes in their way; but they would still allow the brewer to obtain a livelihood; and, most probably, give him a larger order at hay time and harvest.

In England, the *farmers*, we believe, would be right glad to malt their own barley, and boil their own wort, and quaff their own loved home-brewed: and wholesome stuff it is, and heartily does it go down, when the dew-drops sparkle on the brow of toilsome industry. Would that we again saw the day when the hospitable, kindly, and grateful feelings between the farmer and his ploughman, which long survived in Scotland, was revived in the hall; when the large hall table was again surrounded by young men and maidens with horny hands, hob-nailed shoes, and gleesome faces; and substantially set out with barley broth, bacon, and peas and barley bannocks, and bickers of ale! Vain wishes, never again to be realized! The selfishness engendered in the manufacturing districts has completely changed for the worse the character of our young peasantry. The young ploughman is now an independent gentleman. If his services are not satisfactory at the plough, he marches off to the loom. A word of rebuke will make him shoulder his solitary chest in the "bothie," and walk off from his service. The simple clod is changed into a mongrel cur, neither peasant nor mechanic. No repeal of the malt-duty—no inducement of home-brewed—will ever again back to the farmer's mansion call the flitting hind. One of these cross-breds between the ploughman and the weaver once told us, that half a year was long enough for service in one place; and another that there was not a young woman about the place to induce *him* to stay another half-year.

The classes enumerated would derive some benefit from a repeal of the malt-duty. Other interests, on the other hand, would suffer from it. Numbers of *excise-officers* would be thrown out of employment or pensioned on the State when their occupation was taken from them. The *treasury* would *feel* a defalcation of five millions Sterling. This money view of the question is very strongly taken up in Scotland. Brewers and distillers maintain, that the malt-duty is a tax which is easily collected; that it cannot be evaded if the officers are alive to their duty; that it only affects those who *choose* to consume the products of malt; that it is a tax which is little felt by each person in the community; and that, although it were entirely abolished, the public expectation would be disappointed, in the same manner as with the repeal of the beer-duty and leather-tax. Brewers assert that they made the L.4 hogshead ale as strong as the L.5, after the reduction in the beer-duty; but the drinkers of ale as stoutly maintain that the ale is no stronger, and that the brewer has in effect pocketed the amount of the beer-duty. The reduction of that duty caused brewers to alter the proportions which they had been so long accustomed to, and it would be some time before experience taught them the proportions requisite to strengthen the ale in correspondence with the reduction of duty.

But the great question remains to be determined, Will the repeal of the malt-duty benefit *agriculture?* There are only two ways by which agriculture can be benefited—by an increased demand for, and an increased price of, barley. The reducing the price of spirits and ale should cause an increased consumption of barley. The trifling reduction, however, of one penny a bottle on strong ale, would hardly induce the people of Scotland to drink more ale. The reduction of 1s. 3½d. on the gallon of malt spirits might increase the consumption of spirits over wine among the better classes. These changes would increase the demand for barley, which would be met with a rise in price or an increase of culture. If [illegible] rose in price equal to the malt-duty taken off, the brewer could not afford to sell ale cheaper than he does at present. Should the increased demand be satisfied by an increased cultivation, less wheat or oats would be grown; for as long as a regular rotation of cropping is observed, no more land than is already can be devoted to barley. The question with the farmers would then be, whether the barley would pay him better than wheat or oats ?

One serious consequence of the repeal yet remains to be told. If brewers and distillers used none but malting barley, the inferior barley consumed at present, chiefly by the raw grain distiller and partly by the brewer, would be reduced in price to the farmer who possesses inferior soil; and we all know that there is comparatively little land in Scotland which is capable of growing the finest malting barley. The inferior barley would be either malted or neglected. If malted, it would not bear the expense of malting, or be fit for all the uses of malt, but at a considerable reduction of price. If it shall become unsaleable, the greatest proportion of the farmers in Scotland would be obliged to apply it to the feeding of cattle. The good barley land would thus be encouraged by a premium, and the inferior discouraged by neglect.

Upon the whole, we cannot possibly anticipate any advantage which the reduction of the malt-duty would confer on *agriculture*. On account of the advantages to the community, we should wish it were repealed; but to hold out the repeal as a boon to the farmer is, we verily believe, only to inspire in him a hope which experience will soon disappoint. On this account, we are astonished to see sensible men feel and act so strongly on this subject. We would beseech them not to divert the attention of the farmer from more urgent considerations, from subjects which more *directly* affect him. The benefits arising from a repeal of this duty could only affect the farmer *indirectly*; it must first affect the brewer, distiller, and maltster, before it can reach him; and as to its granting him the power of brewing his own ale, he can do that now by purchasing ready made malt. But the more urgent and direct objects which would materially affect the interest of the farmer is, a commutation of tithe, which would enable him to work and crop and improve his land as he thought most conducive to his own interest, without interference or hinderance;—a reduction of rent in conformity to prices, as nearly as the circumstances of landlords will allow;—a relief from direct burdens, which ought to be equallized over the whole community. Why should the landed interest maintain the roads, bridges, and jails, and prosecute all the rogues in the country parishes, when the community derives equal benefit with them ? Farmers should seriously consider the necessity of economising labour. Many extravagant and antiquated modes of working land should be relinquished for more active and direct modes of attaining the same end. Many useless clumsy instruments should be laid aside for others constructed on more correct principles of mechanism. Many expensive animals should be parted with, and no more living machinery of brute force kept and maintained than what is just requisite for labour. To these and such as these ought the attention of farmers, *in the first instance*, to be directed; and having attained all these, and operating upon them to their full effect, then let the malt-duty be repealed by all means, as a make-weight in the balance in favour of the farmer.

## FOREIGN CORN MARKETS.

Our Table of the Monthly Returns shews how little has been done in foreign grain during the last quarter. In fact, the foreign trade excites no particular interest. All that we think necessary to notice about it, is to give the latest account of prices from Hamburg and Danzig.

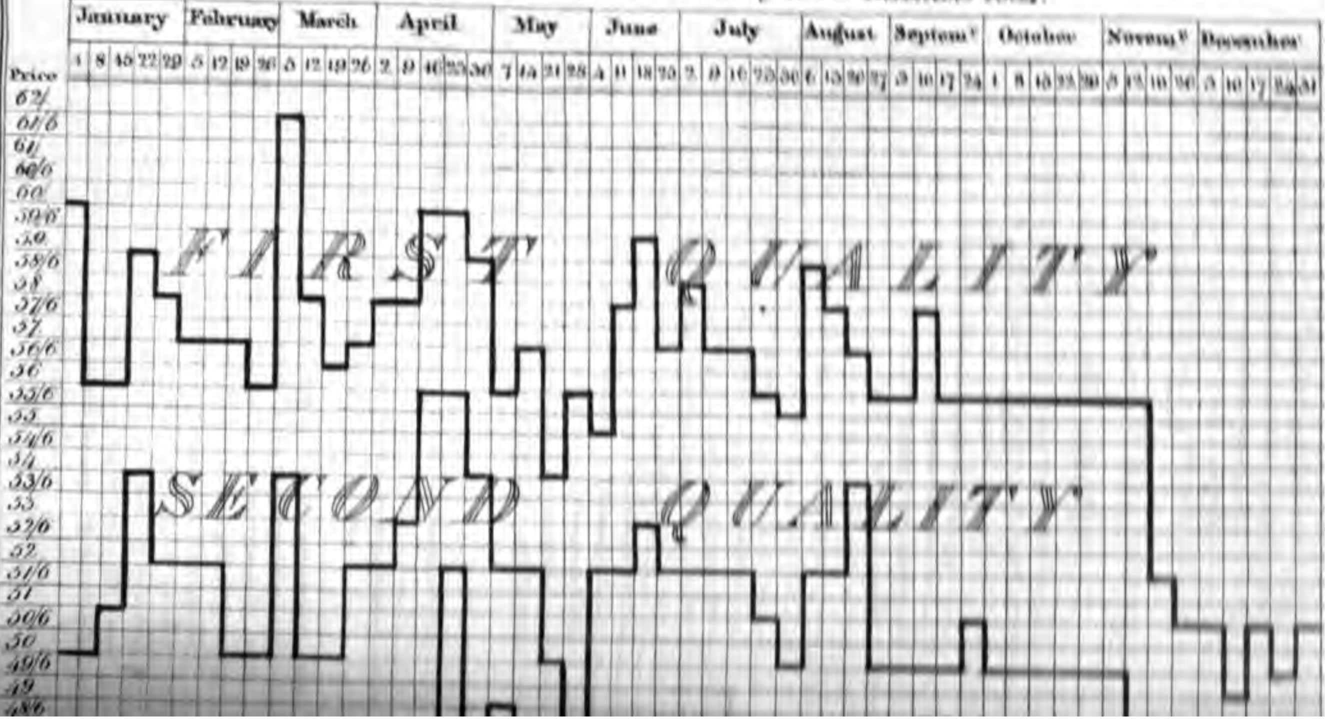
Hamburg, *May* 5.—Our market for wheat is rather dull, but for other articles very little or no business has been done; the market continues firm, particularly for oats and beans, the stocks of which are nearly exhausted. Feed oats in Jeverland may be quoted 11s. to 11s. 6d.; in Jutland and Danish Islands 11s. 6d. to 11s. 10d.; in Sweden 11s. 6d. to 12s. Beans in the Elbe 22s. 6d.; in Jeverland 23s. to 23s. 6d. Rapecakes may be purchased at from 77s. to 80s. Linseed cakes L. 5, 5s. to L. 6, 2s.

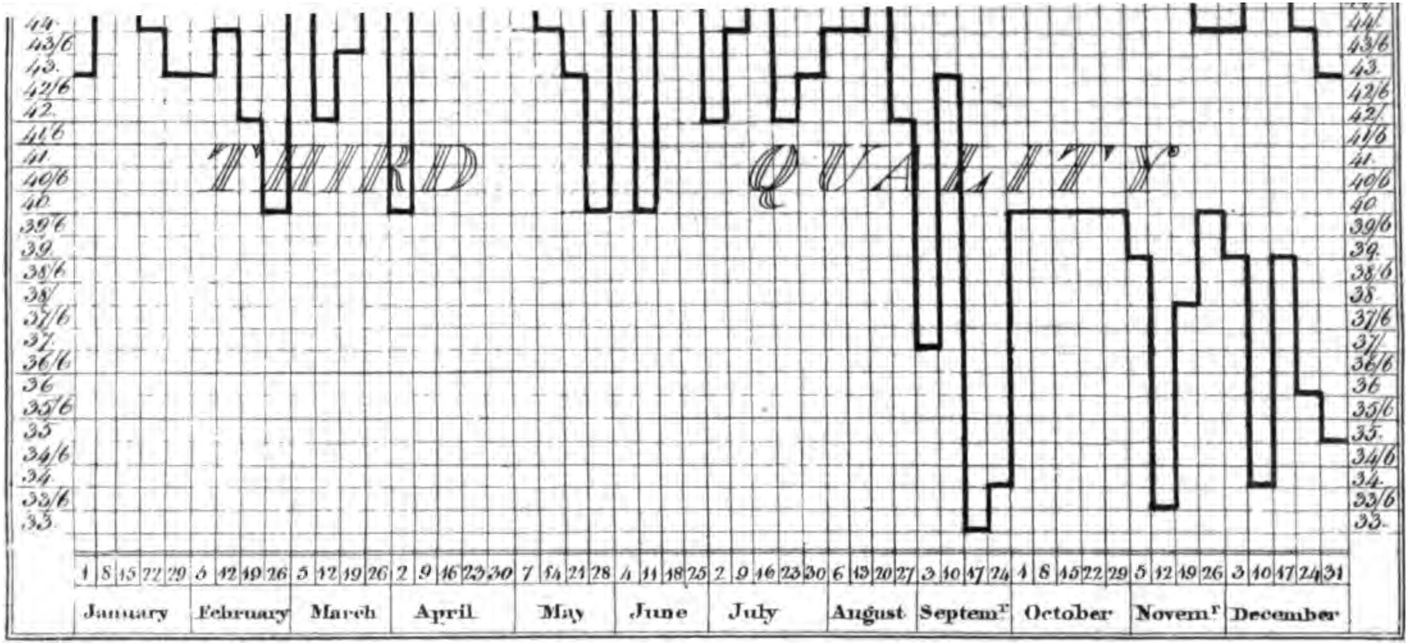
Danzig, *April* 30.—The wheat market is quietly moving on, about 110 lasts of new Wheat have been sold in the market since our last to several parties at about 29s. The supplies continue upon a very limited scale and are not likely to increase, in which event a very few orders will be sufficient to keep our prices up. 75 lasts of high mixed old wheat have been sold to a speculator at about 26s per qr. for shipment to Holland. The weather is precisely the same which you represent it to be with you, cold winds prevail and the ground is parched up, to a degree that apprehensions are entertained about the spring crops; however, seasonable showers will alter the features of the country very materially.

## Tabular View of the Prices of the different qualities of Wheat in the Edinburgh Market in 1834.

We have pleasure in presenting our readers with an ingeniously constructed table of the weekly prices of wheat of all the three qualities in the Edinburgh market for the year 1834. The idea is not new, for tables of the barometer and the funds are frequently made on the same principle; but this is the first which we have seen in which that principle has been applied to the prices of corn. Its prototype was beautifully constructed by Mr William Callender of Sir William Forbes and Company's banking establishment in this city, at his leisure moments, for his own amusement; and presented to Mr Lawson, the Seedsman to the Highland Society. It is to Mr Lawson's liberality that we are indebted for this copy of it.

**TABLE** *shewing the Price Per Quarter of the First, Second & Third Qualities of* **WHEAT** *in the Edinburgh Market from 1st January to 31st December 1834.*





*EXPLANATION* *This Table shews the price Per Quarter of the three different qualities on each Market-day during the year. To find the price for any day, find the date at the top or bottom of the Table; & on either side, in a straight line with that part of the thick black line which cuts the column at the top of which the date stands, the price will be found.*

*Example* *To find the price on the 18^th^ day of June find the date at the top of the Table, and on the 6^th^ line underneath will be seen the thick horizontal line, this being carried out to the margin will shew the price of the first quality to have been on that day 59/6; farther down the price of the second quality will be found to have been 53/; and still lower down in the Table the price of the third quality to have been 46/.*

Forrester & Nichol Lithog.

## TABLES OF PRICES, &c.

*ge Prices of the different kinds of GRAIN, per Imperial Quarter, sold at the following Markets :—*

### LONDON.

| heat. | | Barley. | | Oats. | | Rye. | | Pease. | | Beans. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| 5 | 2 | 33 | 8 | 23 | 6 | 31 | 6 | 40 | 2 | 36 | 5 |
| 5 | 1 | 33 | 10 | 23 | 7 | 31 | 8 | 39 | 10 | 36 | 4 |
| 5 | 1 | 35 | 6 | 23 | 8 | 32 | 0 | 39 | 3 | 37 | 1 |
| 3 | 4 | 35 | 8 | 23 | 10 | 31 | 6 | 39 | 0 | 37 | 3 |
| 3 | 11 | 34 | 1 | 23 | 8 | 30 | 8 | 38 | 6 | 36 | 3 |
| 2 | 9 | 33 | 4 | 23 | 7 | 31 | 0 | 37 | 4 | 35 | 0 |
| 2 | 10 | 34 | 4 | 23 | 8 | 30 | 9 | 38 | 0 | 36 | 0 |
| 3 | 1 | 35 | 0 | 23 | 6 | 30 | 4 | 37 | 7 | 36 | 8 |
| 3 | 3 | 35 | 2 | 23 | 5 | 30 | 0 | 37 | 3 | 37 | 6 |
| 2 | 10 | 34 | 10 | 23 | 8 | 29 | 10 | 36 | 9 | 3 | 8 |
| 1 | 11 | 34 | 3 | 23 | 8 | 29 | 8 | 36 | 6 | 37 | 1 |
| 1 | 10 | 34 | 2 | 24 | 0 | 30 | 8 | 36 | 0 | 36 | 11 |
| 1 | 3 | 32 | 10 | 24 | 6 | 30 | 6 | 36 | 0 | 36 | 2 |

### DUBLIN.

| Date. | Wheat Per Bar. 20 St. | | Barley Per Bar. 16 St. | | Bear Per Bar. 17 St. | | Oats Per Bar. 14 St. | | Flour Per Bar. 9 St. | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1835. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Jan. 23. | 20 | 5 | 14 | 7 | 12 | 5 | 11 | 8 | 13 | 8½ |
| 30. | 20 | 4 | 15 | 8 | 12 | 6 | 11 | 9 | 13 | 7 |
| Feb. 6. | 20 | 0 | 13 | 1 | 12 | 2 | 11 | 6 | 13 | 6 |
| 13. | 20 | 0 | 14 | 0 | 12 | 6 | 11 | 1 | 13 | 6 |
| 20. | 18 | 8 | 14 | 9 | 12 | 4 | 11 | 5 | 13 | 6½ |
| 27. | 19 | 5 | 15 | 2 | 12 | 7 | 11 | 3 | 13 | 3½ |
| Mar. 6. | 20 | 0 | 15 | 6 | 12 | 10 | 11 | 0 | 14 | 0 |
| 13. | 21 | 6 | 15 | 9 | 13 | 4 | 11 | 6 | 14 | 1 |
| 20. | 22 | 6 | 15 | 6 | 13 | 6 | 11 | 9 | 14 | 10 |
| April 27. | 21 | 9 | 15 | 4 | 13 | 6 | 11 | 7 | 13 | 8 |
| 6. | 22 | 0 | 15 | 0 | 13 | 6 | 11 | 6 | 13 | 6 |
| 13 | 22 | 3 | 15 | 6 | 13 | 10 | 12 | 0 | 14 | 6 |
| 20. | 22 | 6 | 15 | 8 | 14 | 0 | 12 | 3 | 14 | 8 |

### LIVERPOOL.

| Wheat. | | Barley. | | Oats. | | Rye. | | Pease. | | Beans. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| 39 | 7 | 28 | 0 | 21 | 2 | 30 | 6 | 39 | 6 | 37 | 7 |
| 40 | 3 | 27 | 10 | 21 | 4 | 30 | 4 | 38 | 6 | 36 | 4 |
| 38 | 10 | 27 | 5 | 21 | 9 | 30 | 5 | 38 | 9 | 37 | 2 |
| 39 | 2 | 29 | 7 | 21 | 0 | 31 | 0 | 38 | 0 | 36 | 6 |
| 39 | 1 | 29 | 3 | 20 | 2 | 30 | 4 | 37 | 6 | 38 | 6 |
| 38 | 8 | 26 | 6 | 21 | 8 | 29 | 6 | 37 | 9 | 39 | 1 |
| 39 | 0 | 26 | 10 | 21 | 10 | 28 | 9 | 36 | 6 | 39 | 0 |
| 40 | 6 | 28 | 6 | 22 | 3 | 29 | 9 | 36 | 8 | 39 | 2 |
| 40 | 9 | 29 | 1 | 22 | 4 | 30 | 0 | 35 | 4 | 39 | 3 |
| 38 | 2 | 29 | 1 | 22 | 3 | 28 | 6 | 34 | 9 | 38 | 4 |
| 38 | 8 | 31 | 1 | 21 | 10 | 30 | 0 | 34 | 6 | 38 | 9 |
| 37 | 6 | 30 | 10 | 21 | 6 | 32 | 0 | 35 | 8 | 39 | 4 |
| 37 | 10 | 28 | 8 | 22 | 0 | 31 | 8 | 36 | 2 | 39 | 0 |

### EDINBURGH.

| Date. | Wheat. | | Barley. | | Oats. | | Pease. | | Beans. | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1835. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Feb. 4. | 44 | 8 | 28 | 6 | 22 | 0 | 30 | 4 | 30 | 8 |
| 11. | 44 | 5 | 29 | 11 | 22 | 4 | 30 | 10 | 31 | 2 |
| 18. | 43 | 6 | 32 | 5½ | 22 | 0 | 31 | 0 | 31 | 2 |
| 25. | 44 | 0 | 34 | 3 | 23 | 0 | 31 | 0 | 31 | 4 |
| Mar. 4. | 43 | 3 | 35 | 6 | 22 | 6 | 31 | 0 | 31 | 6 |
| 11. | 42 | 10 | 34 | 6 | 22 | 0 | 30 | 10 | 31 | 2 |
| 18. | 43 | 6 | 32 | 0 | 22 | 2 | 31 | 2 | 31 | 5 |
| 25. | 43 | 0 | 31 | 6 | 22 | 6 | 31 | 6 | 32 | 0 |
| April 1. | 43 | 2 | 32 | 6 | 23 | 0 | 31 | 6 | 32 | 0 |
| 8. | 44 | 0 | 32 | 2 | 24 | 0 | 31 | 6 | 32 | 6 |
| 15. | 43 | 11½ | 31 | 10 | 25 | 0 | 31 | 0 | 31 | 6 |
| 22. | 43 | 6 | 32 | 6 | 25 | 1 | 31 | 0 | 31 | 4 |
| 29. | 40 | 8 | 31 | 6 | 24 | 7 | 30 | 8 | 31 | 6 |

*E shewing the Weekly Average Prices of GRAIN, made up in terms of 7th and 8th IV. c. 58, and the Aggregate Averages which regulate the Duties payable on FOREIGN N; the Duties payable thereon, from 1st February to 1st May 1835.*

| Wheat. | | | | Barley. | | | | | | Oats. | | | | | | Rye. | | | | | | Pease. | | | | | | Beans. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aggregate Average. | | Duty. | | Weekly Average. | | Aggregate Average. | | Duty. | | Weekly Average. | | Aggregate Average. | | Duty. | | Weekly Average. | | Aggregate Average. | | Duty. | | Weekly Average. | | Aggregate Average. | | Duty. | | Weekly Average. | | Aggregate Average. | | Duty. | |
| s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| 40 | 9 | 46 | 8 | 32 | 7 | 31 | 7 | 15 | 4 | 22 | 0 | 21 | 11 | 15 | 3 | 31 | 1 | 31 | 8 | 22 | 9 | 39 | 5 | 40 | 5 | 9 | 0 | 36 | 1 | 36 | 3 | 15 | 6 |
| 40 | 10 | 46 | 8 | 32 | 9 | 31 | 10 | 15 | 4 | 22 | 0 | 21 | 11 | 15 | 3 | 31 | 7 | 31 | 6 | 22 | 9 | 38 | 3 | 39 | 10 | 11 | 0 | 36 | 2 | 36 | 1 | 15 | 6 |
| 41 | 0 | 45 | 8 | 32 | 11 | 32 | 2 | 13 | 10 | 22 | 3 | 22 | 0 | 13 | 9 | 31 | 6 | 31 | 5 | 22 | 9 | 38 | 9 | 39 | 5 | 11 | 0 | 36 | 6 | 36 | 2 | 15 | 6 |
| 41 | 0 | 45 | 8 | 32 | 8 | 32 | 5 | 13 | 10 | 22 | 6 | 22 | 1 | 13 | 9 | 30 | 5 | 30 | 10 | 24 | 3 | 38 | 0 | 39 | 5 | 11 | 0 | 35 | 10 | 36 | 1 | 15 | 6 |
| 41 | 0 | 45 | 8 | 32 | 3 | 32 | 7 | 13 | 10 | 22 | 7 | 22 | 2 | 13 | 9 | 29 | 11 | 31 | 0 | 22 | 9 | 37 | 11 | 38 | 7 | 12 | 6 | 36 | 2 | 36 | 2 | 15 | 6 |
| 40 | 9 | 46 | 8 | 32 | 1 | 32 | 6 | 13 | 10 | 22 | 5 | 22 | 4 | 13 | 9 | 30 | 4 | 30 | 10 | 24 | 3 | 36 | 9 | 38 | 3 | 12 | 6 | 36 | 1 | 36 | 2 | 15 | 6 |
| 40 | 6 | 46 | 8 | 32 | 2 | 32 | 6 | 13 | 10 | 22 | 2 | 22 | 6 | 13 | 9 | 29 | 3 | 30 | 8 | 24 | 3 | 37 | 3 | 38 | 0 | 14 | 0 | 36 | 2 | 36 | 4 | 15 | 6 |
| 40 | 2 | 46 | 8 | 32 | 3 | 32 | 5 | 13 | 10 | 22 | 5 | 22 | 5 | 13 | 9 | 30 | 0 | 30 | 10 | 24 | 3 | 37 | 8 | 37 | 7 | 14 | 0 | 36 | 4 | 36 | 2 | 15 | 6 |
| 40 | 0 | 46 | 8 | 32 | 8 | 32 | 4 | 13 | 10 | 22 | 8 | 22 | 6 | 13 | 9 | 28 | 0 | 29 | 8 | 25 | 9 | 36 | 8 | 37 | 3 | 14 | 0 | 36 | 8 | 36 | 2 | 15 | 6 |
| 39 | 1 | 47 | 8 | 33 | 0 | 32 | 5 | 13 | 10 | 23 | 1 | 22 | 7 | 13 | 9 | 31 | 1 | 29 | 10 | 25 | 9 | 34 | 9 | 36 | 8 | 15 | 6 | 36 | 4 | 36 | 3 | 15 | 6 |
| 39 | 9 | 47 | 8 | 32 | 7 | 32 | 5 | 13 | 10 | 22 | 10 | 22 | 7 | 13 | 9 | 32 | 2 | 30 | 2 | 24 | 3 | 34 | 4 | 36 | 1 | 15 | 6 | 36 | 3 | 36 | 4 | 15 | 6 |
| 39 | 7 | 47 | 8 | 32 | 5 | 32 | 6 | 13 | 10 | 23 | 3 | 22 | 9 | 13 | 9 | 32 | 5 | 30 | 6 | 24 | 3 | 36 | 0 | 35 | 11 | 16 | 0 | 36 | 6 | 36 | 4 | 15 | 6 |
| 39 | 5 | 47 | 8 | 32 | 0 | 32 | 6 | 13 | 10 | 23 | 5 | 22 | 11 | 13 | 9 | 31 | 6 | 30 | 11 | 24 | 3 | 34 | 10 | 35 | 6 | 16 | 0 | 36 | 5 | 36 | 11 | 15 | 6 |

*The MONTHLY RETURNS, published in terms of 9th Geo. IV. c. 60, **showing the Qu***
***Corn, Grain, Meal, and Flour imported into the United Kingdom in each Month; the***
***upon which duties have been paid for home-consumption, during the same Month; and t***
***tities remaining in Warehouse at the close thereof: from 5th January to 5th April 1835.***

| Month ending | IMPORTED. | | | CHARGED WITH DUTY. | | | REMAINING IN WARE | |
|---|---|---|---|---|---|---|---|---|
| | From Foreign Countries. | From British Posses-sions. | Total. | From Foreign Countries. | From British Posses-sions. | Total. | From Foreign Countries. | From British Posses-sions. |
| *Feb.* 5. 1835. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. |
| Vheat, . . | 2 4 | 4,098 7 | 4,101 3 | 3 4 | 1,060 6 | 1,064 2 | 614,179 4 | 50,153 6 |
| larley, . . | 6,217 1 | .. | 6,217 1 | 6,483 7 | .. | 6,483 7 | 164,457 5 | 25 1 |
| ats, . . | 1 2 | .. | 1 2 | 16 6 | .. | 16 6 | 326,987 0 | 666 0 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 5,108 3 | .. |
| ease, . . | 4,501 3 | 126 0 | 4,627 3 | 12,972 2 | 11 4 | 12,983 6 | 1,607 5 | 114 4 |
| eans, . . | 1,198 1 | .. | 1,198 1 | 5,970 5 | .. | 5,970 5 | 34,799 6 | .. |
| Totals, . | 11,920 3 | 4,224 7 | 16.145 2 | 25,447 0 | 1,072 2 | 26,519 2 | 1,147,139 7 | 50,939 3 |
| *Mar.* 5. | | | | | | | | |
| Vheat, . . | 112 6 | 2,682 4 | 2,795 2 | 1 3 | 1,260 6 | 1,262 1 | 611,604 4 | 51,575 4 |
| arley, . . | 5,064 0 | .. | 5,064 0 | 3,527 4 | .. | 3,527 4 | 165,953 0 | 25 1 |
| ats, . . | 434 6 | .. | 434 6 | 55 2 | .. | 55 2 | 324,072 2 | 666 0 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 5,108 3 | .. |
| ease, . . | 613 0 | .. | 613 0 | 154 1 | 30 0 | 184 1 | 2,306 1 | 84 4 |
| eans, . . | 136 6 | .. | 136 6 | 210 7 | .. | 210 7 | 34,819 0 | .. |
| Totals, . | 6,361 2 | 2,682 4 | 9,043 6 | 3,949 1 | 1,290 6 | 5,239 7 | 1,143,863 2 | 52,351 1 |
| *April.* 5. | | | | | | | | |
| heat, . . | 872 7 | 365 6 | 1,238 5 | 9 1 | 1,309 7 | 1,319 0 | 608,809 6 | 50,202 2 |
| arley, . . | 14,917 4 | .. | 14,917 4 | 23,885 1 | .. | 23,885 1 | 156,951 1 | 25 1 |
| ats, . . | 428 7 | .. | 428 7 | 245 6 | .. | 245 6 | 326,751 6 | 666 0 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 5,108 3 | .. |
| se, . . | 4,558 5 | .. | 4,558 5 | 643 1 | 40 0 | 683 1 | 6,061 2 | 44 0 |
| ns, . . | 1,025 2 | .. | 1,025 2 | 131 2 | .. | 131 2 | 35,207 6 | .. |
| Totals, . | 21,803 1 | 365 6 | 22,163 7 | 24,914 3 | 1,349 7 | 25,264 2 | 1,138,890 0 | 50,937 3 |
| . 5. 1835. | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb |
| our, . . | 364 2 27 | 1,455 3 21 | 1,820 2 20 | 17 3 23 | 3,282 0 23 | 3,300 0 18 | 330,953 0 3 | 36,607 0 3 |
| tmeal, . | 7 2 13 | .. | 7 2 13 | .. | .. | .. | 9 3 13 | .. |
| Totals, . | 372 1 12 | 1,455 3 21 | 1,828 1 5 | 17 3 23 | 3,282 0 23 | 3,300 0 18 | 330,962 3 16 | 36,607 0 3 |
| *Mar.* 5. | | | | | | | | |
| lour, . . | 2,964 2 14 | 2,757 0 13 | 5,721 2 27 | 2 2 12 | 2,128 0 6 | 2,130 2 18 | 322,100 1 25 | 37,236 0 10 |
| atmeal, . | .. | .. | .. | .. | .. | .. | 8 1 10 | .. |
| Totals, . | 2,964 2 14 | 2,757 0 13 | 5,721 2 27 | 2 2 12 | 2,128 0 6 | 2,130 2 18 | 322,108 3 7 | 37,236 0 10 |
| *April* 5. | | | | | | | | |
| lour, . . | 6,809 1 25 | 143 1 21 | 6,952 3 18 | 7 0 25 | 4,337 0 26 | 4,344 1 23 | 316,548 1 13 | 33,028 0 5 |
| atmeal, . | 6 2 12 | .. | 6 2 12 | .. | .. | .. | 9 2 0 | .. |
| Totals, . | 6,816 0 9 | 143 1 21 | 6,959 2 2 | 7 0 25 | 4,337 0 26 | 4,344 1 23 | 316,557 3 13 | 33,028 0 5 |

## *PRICES of BUTCHER-MEAT.*

| | SMITHFIELD, *Per Stone of* 14 lb. | | MORPETH, *Per Stone of* 14 lb. | | EDINBURGH, *Per Stone of* 14 lb. | | GLASGOW, *Per Stone of* 14 lb. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Beef. | Mutton. | Beef. | Mutton. | Beef. | Mutton. | Beef. | Mutto |
| 1835. Feb. | 5/6 @ 5/9 | 5/9 @ 6/6 | 5/3 @ 5/6 | 5/6 @ 6/3 | 5/3 @ 6/ | 5/3 @ 6/ | 5/6 @ 6/ | 5/6 @ |
| Mar. | 5/9 6/3 | 6/ 6/9 | 5/9 6/3 | 5/9 6/6 | 5/6 6/3 | 5/6 6/3 | 5/9 6/3 | 5/9 |
| April | 6/ 6/6 | 6/6 7/ | 6/ 6/3 | 6/3 6/6 | 5/6 6/3 | 5/9 6/6 | 6/ 6/3 | 6/ |

## *PRICES of English and Scotch WOOL.*

ENGLISH, per 16 lb.—*Merino*, Washed, 28/ @ 30/; in Grease, 20/ @ 25/.—*South Down*, 26/ @ 2
*Leicester*, 22/ @ 24/6; Ewe and Hogg, 20/ @ 22/6.—*Locks*, 13/ @ 16/; *Moor*, 10/6 @ 12/.

SCOTCH, per 24 lb.—*Leicester*, 30/ @ 36/; Ewe and Hogg, 28/ @ 32/.—Ewe, 26/ @ 29/.—*Chevio*
White, 26/ @ 30/; [illegible] 12 @ [illegible], 15/ @ 17/; *Moor*, White, 13/ @ 14/; Laid, 10/6 @ 11/6.

## THE REVENUE.

***ABSTRACT** of the Net Produce of the Revenue of Great Britain, in the Quarters and Years ended on the 5th of April 1834, and 5th of April 1835, showing the Increase and Decrease on each head thereof.*

| | Quarters ended April 5. | | Increase. | Decrease. | Years ended April 5. | | Increase. | Decrease. |
|---|---|---|---|---|---|---|---|---|
| | 1834. | 1835. | | | 1834. | 1835. | | |
| | £ | £ | £ | £ | £ | £ | £ | £ |
| **Customs,** . . | 3,603,267 | 4,286,877 | 683,610 | . . | 15,133,005 | 17,620,305 | 2,487,300 | . . |
| **Excise,** . . . . | 2,703,561 | 1,687,574 | . . | 1,015,987 | 14,943,948 | 12,150,068 | . . | 2,793,880 |
| **Stamps,** . . . | 1,671,450 | 1,654,387 | . . | 17,063 | 6,586,098 | 6,565,171 | . . | 20,927 |
| **Post-Office,** | 334,000 | 359,000 | 25,000 | . . | 1,374,000 | 1,386,000 | 12,000 | . . |
| **Taxes,** . . . . | 483,351 | 245,364 | . . | 237,987 | 4,865,846 | 4,312,627 | . . | 553,219 |
| **Miscellaneous,** | 11,285 | 10,988 | . . | 297 | 51,940 | 56,622 | 4,682 | . . |
| | 8,806,914 | 8,244,190 | 708,610 | 1,271,334 | 42,954,837 | 42,090,793 | 2,503,982 | 3,368,026 |
| | Deduct increase, . . | | | 708,610 | Deduct Increase, | | | 2,503,982 |
| | Decrease on the quarter, | | | 562,724 | Decrease on the year, | | | 864,044 |

***FIAR PRICES** of the different **COUNTIES** of **SCOTLAND**, for Crop and Year 1834, by the Imperial Measure.*

### ABERDEENSHIRE.

| | Imp. Qr. |
|---|---|
| **Wheat,** without fodder, . | 39/ |
| ——— with fodder, . . | 46/ |
| **Barley,** without fodder, . | 26/4½ |
| ——— with fodder, . . | 31/4½ |
| **Bear,** without fodder, . . | 24/10 |
| ——— with fodder, . . . | 29/9½ |
| **Oats,** Potato, without fodder, | 21/8 |
| ——— with fodder, . | 28/2 |
| ——— White, without fodder, | 20/2 |
| ——— with fodder, | 26/8 |
| **Pease,** . . . . . . . . . | 27/ |
| **Beans,** . . . . . . . . . | 26/3 |
| **Malt,** . . . . . . . . . | |
| **Oatmeal,** per Boll, 140 lb, . | 14/6 |

### ARGYLE.

| | |
|---|---|
| **Bear,** . . . . . . . . . | 26/4 |
| **Oats,** . . . . . . . . . | 18/8 |
| **Beans,** . . . . . . . . . | 30/8 |
| **Oatmeal,** per Boll, 140 lb, . | 15/7½ |

### AYR.

| | |
|---|---|
| **Wheat,** . . . . . . . . | 37/7½ |
| **Barley,** . . . . . . . . | 26/3 |
| **Bear,** . . . . . . . . . | 22/8½ |
| **Oats,** . . . . . . . . . | 16/8 |
| **Pease and Beans,** . . . . | 30/6 |
| **Oatmeal,** per Boll, 140 lb, . | 14/6 |

### BANFF.

| | |
|---|---|
| **Wheat,** . . . . . . . . | 36/6 |
| **Barley,** without fodder, . | 25/3 |
| ——— with fodder, . . . | 30/3 |
| **Bear,** First, without fodder, | 23/6 |
| ——— with fodder, . | 28/6 |
| ——— Second, without fodder, | 21/6 |
| ——— with fodder, . | 26/6 |
| **Oats,** Potato, without fodder, | 21/ |
| ——— with fodder, . | 28/ |
| ——— Common, without fod., | 19/ |
| ——— with fodder, | 26/ |
| **Pease,** . . . . . . . . . | 26/ |
| **Beans,** . . . . . . . . . | 27/ |
| **Oatmeal** per Boll, 140 lb, . | 14/8 |

### BERWICKSHIRE.

| | Imp. Qr. |
|---|---|
| Wheat, . . . . . . . . | 36/8½ |
| Barley, Merse, . . . . | 24/8 |
| ——— Lammermuir, . . | 22/5½ |
| Oats, Merse, . . . . . . | 19/9½ |
| ——— Lammermuir, . . | 19/6½ |
| Pease, . . . . . . . . | 28/0½ |
| Oatmeal, per Boll, 140 lb, | 14/9½ |

### BUTE.

| | |
|---|---|
| Wheat, . . . . . . . . . | 38/8 |
| Barley, . . . . . . . . . | 26/10 |
| Bear, . . . . . . . . . | 22/6 |
| Oats, . . . . . . . . . | 20/ |
| Pease, . . . . . . . . . | 31/6 |
| Beans, . . . . . . . . . | 31/6 |
| Oatmeal, per 140 lb, . . . | 15/9½ |

### CAITHNESS.

| | |
|---|---|
| Bear, . . . . . . . . . | 20/ |
| Oats, Potato, . . . . . | 18/ |
| ——— Angus, . . . . . | 17/ |
| Oatmeal, per 140 lb, . . . | 14/ |

### CLACKMANNAN.

| | |
|---|---|
| Wheat, . . . . . . . | 39/0½ |
| Barley, Kerse, . . . . | 27/4½ |
| ——— Dryfield, . . . | 26/8½ |
| Oats, Kerse, . . . . . | 17/11 |
| ——— Dryfield, . . . . | 18/11½ |
| Pease and Beans, . . . | 27/9½ |
| Malt, . . . . . . . . | 47/ |
| Oatmeal, per Boll, 140 lb, | 15/4½ |

### DUMBARTON.

| | |
|---|---|
| Wheat, . . . . . . . . | 39/9 |
| Barley, . . . . . . . . | 28/1 |
| Bear, . . . . . . . . . | 23/10 |
| Oats, . . . . . . . . . | 20/3 |
| Pease and Beans, . . . . | 32/ |
| Oatmeal, per 140 lb, . . . | 15/6 |

### DUMFRIESSHIRE.

| | Imp |
|---|---|
| Wheat, . . . . . . . . | |
| Barley, . . . . . . . . | |
| Oats, Potato, . . . . . | |
| ——— Common, . . . . | |
| Beans, . . . . . . . . | |
| Rye, . . . . . . . . . | |
| Malt, . . . . . . . . . | |
| Oatmeal, per 140 lb, . . | |

### EDINBURGH.

| | |
|---|---|
| Wheat, First, . . . . . | |
| ——— Second, . . . . | |
| Barley, First, . . . . . | |
| ——— Second, . . . . | |
| ——— Third, . . . . . | |
| Oats, First, . . . . . . | |
| ——— Second, . . . . | |
| Pease and Beans, . . . . | |
| Oatmeal, per Boll, 140 lb,. . | |

### FIFE.

| | |
|---|---|
| Wheat, White, . . . . | |
| ——— Red, . . . . . | |
| Barley, . . . . . . . | |
| Bear, . . . . . . . . | |
| Oats, . . . . . . . . | |
| Pease and Beans, . . . . | |
| Rye, . . . . . . . . | |
| Malt, . . . . . . . . | |
| Meal, 140 lb, . . . . . | |
| ——— by measure, . . . . | |

### FORFAR.

| | |
|---|---|
| Wheat, . . . . . . . | |
| Barley, . . . . . . . | |
| Bear, . . . . . . . . | |
| Oats, Potato, . . . . . | |
| ——— Common, . . . . | |
| Pease and Beans, . . . . | |
| Rye, . . . . . . . . | |
| Oatmeal, per Boll, 140 lb.,. | |

### HADDINGTONSHIRE.

| | Imp. Qr. |
|---|---|
| Wheat, First, | 44/10½ |
| —— Second, | 42/1¾ |
| —— Third, | 39/7¼ |
| Barley, First, | 31/2 |
| —— Second, | 27/4½ |
| —— Third, | 25/3¾ |
| Oats, First, | 21/10½ |
| —— Second, | 20/11½ |
| —— Third, | 19/10½ |
| Pease, First, | 32/10½ |
| Beans, Second, | 29/10½ |
| —— Third, | 28/6½ |

### INVERNESS.

| | |
|---|---|
| Wheat, without fodder, | 38/6 |
| —— with fodder, | 42/6 |
| Barley, without fodder, | 26/6 |
| —— with fodder, | 29/6 |
| Bear, without fodder, | 23/ |
| —— with fodder, | 26/ |
| Oats, Potato, without fodder, | 21/ |
| —— with fodder, | 24/6 |
| Oats, White, without fodder, | 18/ |
| —— with fodder, | 22/ |
| —— Black, without fodder, | 8/6 |
| —— with fodder, | 11/6 |
| Pease, without fodder, | 28/ |
| —— with fodder, | 33/ |
| Beans, without fodder, | 28/ |
| —— with fodder, | 33/ |
| Rye, without fodder, | 26/ |
| —— with fodder, | 30/ |
| Oatmeal, per Boll, 140 lb, | 15/8 |
| —— Black Oats, 140 lb. | 14/1 |
| —— White, 9 stone, | 17/7 |
| —— Black, do., | 16 |

### KINCARDINE.

| | |
|---|---|
| Wheat, without fodder, | 44/1 |
| —— with fodder, | 51/7 |
| Barley, without fodder, | 27/6 |
| —— with fodder, | 31/6 |
| Bear, without fodder, | 24/3 |
| —— with fodder, | 28/3 |
| Oats, Potato, without fodder, | 21/7 |
| —— with fodder, | 26/7 |
| —— Common, without fod. | 19/10 |
| —— with fodder, | 24/10 |
| Pease, without fodder, | 28/4 |
| —— with fodder, | 35/10 |
| Beans, without fodder, | 28/10 |
| —— with fodder, | 36/10 |
| Oatmeal, per 140 lb, | 15/4 |

### KIRKCUDBRIGHT.

| | |
|---|---|
| Wheat, | 39/2 |
| Barley, | 24/4 |
| Bear, | 20/ |
| Oats, Potato, | 17/8 |
| —— Common, | 16/ |
| Oatmeal, per Boll, 140lb, | 13/1½ |

### KINROSS.

| | |
|---|---|
| Wheat, | 37/6 |
| Barley, First, | 26/ |
| —— Second, | 22/ |
| Bear, First, | 21/ |
| — Second, | 17/ |
| Oats, White, First, | 19/10 |
| —— Second, | 17/10 |
| — Black, First, | 16/6 |
| —— Second, | 14/6 |
| Pease and Beans, | 25/ |
| Malt, | 47/ |
| Oatmeal, per 140lb, | 14/6 |

### LANARKSHIRE.

| | Imp. Qr. |
|---|---|
| Wheat, First, | 38/10 |
| —— Second, | 37/8 |
| Barley, First, | 28/6 |
| —— Second, | 25/2 |
| Bear, First, | 24/8 |
| Bear, Second, | 21/2 |
| Oats, First, | 18/ |
| —— Second, | 17/8 |
| Pease, | 30/ |
| Beans, First, | 32/4 |
| —— Second, | 30/4 |
| Malt, | 50/8 |
| Oatmeal, per Boll, 140lb. | 14/10 |

### ARCHBISHOPRIC OF GLASGOW.

| | |
|---|---|
| Barley, | 29/1 |
| Oats, | 18/4 |
| Meal, per 140lb, | 17/1 |

### LINLITHGOW.

| | |
|---|---|
| Wheat, | 38/8 |
| Barley, | 29/ |
| Oats, | 19/8 |
| Pease, | 29/8 |
| Malt, | 49/8 |
| Oatmeal, per 140 lb, | 14/8½ |

### MORAY AND ELGIN.

| | |
|---|---|
| Wheat, | 37/8 |
| Barley, | 24/9 |
| Oats, | 18/9 |
| Rye, | 27/ |
| Pease and Beans, | 30/ |
| Oatmeal, per 140 lb, | 15/8¾ |

### NAIRN.

| | |
|---|---|
| Wheat, | 30/ |
| Barley, without fodder, | 25/ |
| —— with fodder, | 28/ |
| Oats, without fodder, | 18/ |
| —— with fodder, | 23/ |
| Oatmeal, per 140 lb, | 15/7½ |

### PEEBLES.

| | |
|---|---|
| Wheat, First, | 42/7½ |
| —— Second, | 40/3½ |
| —— Third, | 35/11 |
| Barley, First, | 27/6¾ |
| —— Second, | 25/10 |
| —— Third, | 23/6¼ |
| Oats, First, | 18/7½ |
| —— Second, | 17/6¼ |
| —— Third, | 16/3½ |
| Pease, First, | 28/11 |
| —— Second, | 28/3½ |
| —— Third, | 27/9¾ |
| Oatmeal, First, per Boll, 140lb, | 14/2 |
| —— Second, | 13/10 |
| —— Third, | 13/6 |

### PERTH.

| | |
|---|---|
| Wheat, First, | 44/ |
| —— Second, | 38/6 |
| Barley, First, | 26/5 |
| —— Second, | 23/10 |
| Oats First, | 20/4 |
| —— Second, | 19/1 |
| Pease and Beans, | 27/11 |
| Oatmeal, per Boll, 140 lb, | 14/5 |

### RENFREWSHIRE.

| | Imp. Qr |
|---|---|
| Wheat, First, | 40/8½ |
| —— Second, | 39/11 |
| Barley, First, | 8/3½ |
| —— Second, | 26/8¾ |
| Bear, First, | 25/2 |
| —— Second, | 24/6½ |
| Oats, First, | 22/6 |
| —— Second, | 19/10 |
| Beans, First, | 32/11 |
| —— Second, | 31/7½ |
| Oatmeal, per Boll, of 140 lb, | 15/10 |

### ROXBURGH.

| | |
|---|---|
| Wheat, | 39/4 |
| Barley, | 24/4 |
| Oats, | 19/ |
| Pease, | 26/8 |
| Beans, | 28/ |
| Oatmeal, 140 lb, | 14/2 |

### ROSS AND CROMARTY.

| | |
|---|---|
| Wheat, | 38/1¾ |
| Barley, | 26/3 |
| Bear, | 21/ |
| Oats, Potato, | 20/5½ |
| —— Common, | 19/0½ |
| Pease, | 27/4½ |
| Beans, | 28/6 |
| Oatmeal, per Boll, 140 lb, | 14/8 |
| Barley Meal, | 13/1 |

### SELKIRK.

| | |
|---|---|
| Wheat, | 37/ |
| Barley, | 24/ |
| Oats, Potato, | 19/1 |
| —— Common, | 17/ |
| Pease, | 24/ |
| Oatmeal, per 140 lb, | 14/ |

### STIRLING.

| | |
|---|---|
| Wheat, | 38/8 |
| Barley, Kerse, | 26/8 |
| —— Dryfield, | 26/ |
| Oats, Kerse, | 19/ |
| —— Dryfield, | 18/4 |
| —— Muirland, | 17/ |
| Pease and Beans, | 29/ |
| Malt, | 48/ |
| Oatmeal, per Boll, 140 lb, | 14/6 |

### SUTHERLAND.

| | |
|---|---|
| Wheat, | 38/ |
| Barley, | 27/ |
| Bear, | 24/ |
| Oats, Potato, | 22/6 |
| —— Common, | [illegible] |
| Pease, | [illegible] |
| Oatmeal, 140lb, | 14/ |

### WIGTON.

| | |
|---|---|
| Wheat, | [illegible] |
| Barley, | [illegible] |
| Bear, | [illegible] |
| Oats, Potato, | [illegible] |
| —— Common, | [illegible] |
| Beans, | [illegible] |
| Rye, | [illegible] |
| Malt, | [illegible] |
| Oatmeal, 140 lb. | [illegible] |

We [illegible] inform our English readers, that the Fiar Prices are the average prices of grain, as [illegible] year by the verdicts of Juries in every county of Scotland. These Juries are summoned in spring, [illegible] from the evidence produced to them, the average prices of the preceding crop. By these prices, rents [illegible] grain, and similar contracts, are generally determined; but the main object is to convert into money [illegible] (for the most part fixed at a certain quantity of grain) of the Scottish Clergy.

THE

QUARTERLY

JOURNAL OF AGRICULTURE.

## OBSERVATIONS ON THE AGRICULTURE AND GENERAL CIRCUMSTANCES OF THE COUNTY OF WICKLOW.

This county contains about 500,000 English acres, and presents a surface of the most varied nature.

Were we to indulge our taste for the *picturesque*, and go back in imagination some thirty years ago, to the happy period of our honey-moon, when we visited the Avon and Ovoca, and made love and sundry amorous grimaces at our fair bride on their margins, and rambled through the woods and vales which render this county the most beautiful in the "Emerald Isle," we should grow *romantic*, and quote Tommy Moore's Melodies, and be very bad company for the generality of our agricultural readers, who desire information of a far different kind.

We must therefore put a snaffle upon our discursive gambols, and proceed at the slow and regular gait of a Flanders mare. This county—without another word about its fine scenery—extends about 40 English miles from north to south, and from east to west 33 miles, and lies on the east side of the island, and immediately south of the metropolis. It is divided, like all the other counties of Ireland, into Baronies, viz. of Arklow, Newcastle, Rathdown Half Barony, Ballinacor, Upper Talbotstown and Lower Talbotstown, and Shillelagh Half Barony.

The principal towns are, Wicklow, Arklow, Rathdown, and Bray. There are several smaller towns in the mountain district, and many neat and picturesque villages in the eastern division, among which Enniskerry and Newtown Mount Kennedy hold the foremost rank.

The Barony of Ballinacor (which in its general character is mountainous, and contains a large proportion of bog) and a great part of upper Talbotstown (of the same character), running north and south, nearly divide the eastern or coast side from the western, which is bounded by the counties of Carlow, Dublin, and Kildare; so that the two portions of the county are very distinct, and have little intercourse either with each other or with the Barony of Shillelagh, which stands remotely from either, forming the south-west division of the county.

We shall take these eastern and western divisions separately, and give their distinguishing features: —The Barony of Arklow contains 67,621 imperial acres, and is a most interesting portion of the county, being that in which the richly wooded vale of Ovoca, with all its beauties, is situated, a striking contrast to the denuded mountains of its western limits.

The principal proprietors of the eastern and north eastern divisions are,—The Earls of Wicklow, Meath, Carysfort, Fitzwilliam, the Archbishop of Dublin, Lord Powerscourt, the representatives of the late Lord Netterville, and several gentlemen of high character and aristocratic station.

Marl is found in many parts of this district. Nor is there a deficiency of metallic substances. Copper-pyrites, after a cessation of many years, is now raised from the mines in a very spirited manner by an English Company, and taken to the copper works at Swansea, there being no coal (unfortunately for the domestic manufacturer) within the Wicklow mountains, which are composed of granite, with which coals are never known to co-exist. In the vicinity of these copper-mines, and on the mail-coach road between Dublin and Arklow, native gold was found about seventy years ago. "A small piece of gold," says Fraser in his Agriculture of the County of Wicklow, "was found in the stream, about the size of the head of a brass nail: This set many people on the search to try if any more could be found, and he related to me an entertaining account of a schoolmaster in the neighbourhood, who was so possessed with the idea of gold to be found there in great quantities, that he used to go out in the night in search of it, when the schoolboys played a variety of tricks on the poor man; an account of which formed the foundation of Mr O'Keefe's [illegible] piece called the Wicklow Gold Mines. Mr Graham, however, assured me he did not believe that there was any of it to any considerable amount found from that period until the end of August 1796, when a man crossing the brook found a piece of gold about half an ounce weight in the stream. This was about the 24th of August, and immediately the country people began to make workings in search of the gold, which were continued until the 15th of October, when possession was taken of the ground by a party of the Kildare Militia, by an order from government, on which the great concourse of people, who were busily engaged in endeavouring to obtain a share of the treasure, immediately desisted from their labour, and peaceably retired to their houses. Mr Graham, who was present all the time, and purchased a considerable quantity of gold, to the amount of above L. 700, from the country people, told me, that according to the best calculation there was upwards of L. 10,000 paid to the country people for the gold found and sold on the spot, the average price paid for which was L. 3, 15s. an ounce, which makes it appear that 2666 ounces were found in that short space of time."

A paper published among the Philosophical Transactions by Mr Mills, furnishes additional information on this important subject.

"In the end of 1796, or the beginning of the year following, Government determined to continue these workings, and issue a sum of money for that purpose, keeping a separate account in the Exchequer of the receipts, that it might be given to whoever might be found to be entitled thereto, and accordingly issued L. 1000 to Mr Mills, Mr Weaver, and Mr King, as commissioners for that purpose. The operations of the commissioners were put a stop to by the rebellion breaking out in May 1798, at which time the money issued by Government was repaid, and a sum in hands, with which the workings have again been renewed in September last. The operations have been confined to re-washing the sand and ground formerly gone over by the peasantry, and in opening the ground in various places over blue schistus, proceeding gradually towards the hill. The operations are performed by working the sand and soil in huddles, as in the tin stream-works in Cornwall, afterwards in sieves, until they make use of fine linen and muslin, so that no particle of the gold escapes. There is found in these stream-works, besides gold, much magnetic iron-ore in the form of sand; some grain tin has also been found, manganese, bismuth, zinc, and molybdena, in small quantities; so that we can now number eleven metallic substances discovered in this district."

The search for gold has long since ceased, and the more successful operation of working the copper-mines at Cronebane and Ballymurtagh has been for the last few years steadily progressing, and affording employment to above 400 persons.

This barony is remarkable for its woods through the vale of the same name, in which stands in a demesne of uncommon beauty, Shelton Abbey, the magnificent mansion of Lord Wicklow. Timber here grows freely, though within a short distance of the sea, being sheltered from the south-west wind, the prevailing and destructive blast in Ireland. Indeed from Arklow to Ballyarthur both sides of the Ovoca are beautifully wooded.

The average rent of arable land in this division may be estimated at L. 2 per plantation acre, a considerable charge, considering the nature of the soil, which is nowhere *prime*,—schistus and argil being the prevailing components. The dry light land is well suited for an application of marl, which is found for three or four miles towards the interior from the coast. Pebble limestone, imbedded in loose marl and limestone gravel, are found in some places, but there is no limestone rock within the limits of the county. The *origin* of these calcareous strata is more within the province of the geologist than of the agriculturist.

In the division under consideration, comprehending the baronies of Arklow, Newcastle, and Half Rathdown, the farms, notwithstanding the lightness of the soil, have considerable advantages in being sheltered by woods and mountains on the west; in consequence the vegetation is almost perpetual, and the crops, from the nature of the climate, notwithstanding the inferiority of the soil, are not exceeded in produce by those in counties blessed with richer soils. The course of cropping is as follows: In the lowlands, oats (from lea), wheat, potatoes, barley; and in the uplands, oats, potatoes, barley.

In a part of the county so much inhabited by gentlemen of fortune, with suitable demesnes, a good system of farming [illegible] e supposed to prevail, and many specimens of superior practice re to be seen; but the lower grades of the farmers have not nade those advances in husbandry which might reasonably be xpected within thirty or thirty-five miles of the metropolis, and vith a soil peculiarly suited to green-crop culture and cattle-eeding in the house. Though the oat crop, by the ordinary method, is raised upon lea, it is (as is too frequently the case in reland wherever the land is supposed fertile enough to produce t,) often sown upon wheat or barley stubble under the plough, mode which seems to answer well, at least as far as immediate roduce is concerned, in the shallow district between Arklow nd Bray.

The barley crop is sown after potatoes, and ploughed in. he quantity of wheat grown in the whole county of Wicklow as may be supposed from its general character of mountain and og) is inconsiderable, though on the increase especially in the narl district. By far the greater portion is raised on this eastern livision. The mode of culture varies:—In the north-eastern uarter (Half Barony of Rathdown and part of Newcastle) it is own under the plough after the potato crop, and sometimes —at least such used to be the practice—after another crop of vheat. In this reprehensible case, the stubbles of the first crop re ploughed in immediately after its removal, and, with a very hort interval of rest, are sown with wheat covered by the shovel rom the furrows, which are loosened and deepened either with the plough or the spade. The system happily is giving way, and only occasionally practised by the very worst and poorest class of farmers, who are induced by the prospect of a little temporary gain to subject their land to this scourging process, by which, besides the complete exhaustion of the soil, an increased growth of obtruding weeds is generated. Some years ago there was a diversity of opinion as to the respective merits of red and white wheat in the county of Wicklow. In the north-east division the farmer cultivated white, in the south-east part he preferred red wheat. The opinion at that time was, that white wheat answered best in the light soils of the northern, and the red in the stronger (argillaceous) soil of the more southern land. But whatever experience may have ascertained on this point, the fact is indisputable, that the miller prefers the white grain, from its having a thinner skin, and consequently less bran than the other, and yielding a whiter flour. Red wheat is a hardier grain, and, in the long run, will probably best suit the moist climate of Ireland, where the summers are so rarely dry, and favourable to the ripening and harvesting of corn.

The town of Arklow, with a considerable population, is a miserable one,—dirty,—poor,—and filled with fishermen, who, in the interval of their *professional* pursuits, are unemployed, and in the seasons of scarcity extremely distressed. There is little or no trade in Arklow, the *marine* establishment consists of open boats for the purpose of fishing in good weather. The number of hands in each boat is usually six; and when the herring season (one of very brief and always uncertain duration on this coast) is over, the boats are often employed in dredging for oysters, which in fine weather they take to Dublin, and sometimes to Liverpool, though the quality of these oysters (which are sold at home for 6d. or 8d. per hundred) is very inferior. The rent of the fishermen's cabins in Arklow is high,—from 50s. to L. 5 per annum. Though almost contiguous to the princely demesne of the Earl of Wicklow, we believe that the Earl of Carysfort is the principal proprietor of this town; and we strongly recommend the guardians of his Lordship (who is a lunatic) some spirited system of improvement in its condition. The harbour is very bad, and this, while it accounts for its utter insignificance as a port, at the same time assigns an adequate cause for the poverty and degraded condition of its inhabitants, who have no channel of speculative enterprise,—no adequate field for the efforts of industry. The town of Wicklow, of which Lord Fitzwilliam, the Corporation, and Mr Kemmis are the proprietors, is also a very miserable sea-port; the harbour, however, is improvable, but a strong feeling exists through the county in favour of a *new* one, and a petition from the land proprietors of the district is contemplated. Such a work as this is among the most legitimate objects of public expenditure, and would be very beneficial here, and not difficult of execution, as there is abundance of stone within a quarter of a mile of the water's edge. The plan of Mr Nimmo compre[illegible]s a pier [illegible] the embarkation of cattle, &c. on one side. T[illegible] [illegible]imated [illegible] pense of this work is L. 30,000. The present number of tons of shipping employed in the coasting trade to Dublin, and in communication with England and Wales, is only 600, exclusively of small craft, from 15 to 20 tons, employed in the limestone trade, which is very considerable, the annual import being 10,000 tons. Wicklow is the point from which a considerable portion of the county is supplied with limestone. The port, with a depth of twenty feet at low water in spring-tides, is easy of entrance, and, if improved, would make a good asylum for vessels of tonnage, either outward or homeward bound, and contain nearly as many as can ride in Kingstown harbour. The cattle-dealers of the county of Carlow, which adjoins the county of Wicklow on the west, as well as those of Wicklow, would be benefited by the improvement of this harbour.

The number of barrels of corn, of 20 stones imperial each, exported annually from Wicklow, varies from 70,000 to 80,000; and the export of lead and copper ore in the last year (and this will increase) was 8434 tons.

The barony of Newcastle, a more northern portion of the division under present consideration, which contains 52,487 English acres, and stretches along the coast, is of a very similar character with that of Arklow, commanding, however, a more beautiful sea view, and is in many parts well and tastefully wooded.

In this division is the interesting village of Newtown Mount Kennedy, which is one of the few small towns in Ireland remarkable for extreme neatness. The village of Delgany, in its immediate neighbourhood, is also one of those enchanting spots on which the eye of the traveller loves to rest. The demesnes of Mrs Latouche and of Lady Harriet Daly, in particular, with exceedingly neat cottages of their respective tradespeople and tenants, are such as challenge competition with those of any portion of Ireland, and delight the eye of the tourist while they gratify the heart of the philanthropist. The Latouche family at Bellevue have been remarkable, during a lengthened series of years, for their benevolent attention to the circumstances of the poor around them; being ever ready to prevent their wants when practicable, and to alleviate them when unavoidable. Village repositories for the cheap sale of clothes and books, and good schools, are supplied in the spirit of a noble liberality.

At Clonmannon, the demesne of Mr Truel, there are proofs of the great skill and energy displayed by the father of the present proprietor, who was one of the most enterprising agriculturists within the limits of the county, and one of the first of those gentlemen who introduced the drilling of all crops.

Doctor Truell, by the application of marl (in the carriage of which he employed thirty bullocks), rendered a very rocky and otherwise unfavourably circumstanced out-farm fertile. He ascertained that the effects of this ponderous manure are equally beneficial on light and argillaceous soils. Doctor Truell pursued the system of house-feeding cattle, but his example was not followed on the same spirited scale, nor has the culture of turnips been extended as its great importance demands, and as the (generally speaking) dry and warm soil of this division would lead us to expect. The north-east part of the county, comprising part of the barony of Newcastle and Half Rathdown, independently of the temptations of magnificent scenery and high condition of improvement, has, from its proximity to the metropolis, a considerable number of resident gentlemen of the first class, who naturally incline more to handsome lawns and plantations than to a well arranged course of husbandry. This whole tract is dotted with fine demesnes, of which the very extended (it contains 600 acres) and romantic lawns and woods and waterfalls of Powerscourt rank in the highest degree of beauty and importance.

The greater portion of the unwooded parts of this enchanting demesne is under grass; the higher lands, being calcareous, are of course most favourable to sheep feeding. The breed of sheep is highly improved.

When visited by the late Rev. Thomas Radcliff several years ago, on his tour of inspection, one field of sixty-four plantation acres (equal to more than 103 English) was devoted to a succession of experimental crops.

The tenants on the Powerscourt estate are a fine class of yeomanry, holding farms from 150 to 200 acres, by leases of three lives, or thirty-one years, whichever lasts the longest; but, as in other places, these tenants have been too much in the habit of subletting at an extravagant rate to cottiers and labourers.

Limestone gravel has produced the most successful effects, many parts of the barony of Rathdown, in converting barren argillaceous moors into profitable meadow land, and it is only to be regretted that this admirable manure for tenacious soils has not been more generally applied under similar circumstances. It is obvious that the admixture of this calcareous substance with stiff clay, devoid by nature of this earth, operates beneficially in a twofold way; mechanically, by separating the adhesive particles of clay, and as a fertilizing stimulant its calcareous properties. Some years ago the farmers in this north-east division rarely availed themselves of the calcareous manures which Providence had given them, and in the few cases in which they *did* use them, they took corn crop after crop while the ground would yield a grain, and then, without sowing any good grass seeds, suffered the land to rest, unaided by a cleansing fallow or by any manure.

The effects of *marl* are scarcely credible to those who have not witnessed them. There are recorded intances in the barony of Newcastle, on the sea coast, near Newtown Mount Kennedy, of *eighteen successive crops of corn*, from land previously covered with marl suffered to lie on the lea surface three years before breaking up! Farm-yard manure applied to land after marling, as we have had former occasions of remarking, causes the largest crops of potatoes.

The east division of the county of Wicklow has long been famous for its early produce of potatoes and lambs for the Dublin market. It may be interesting to detail the mode of early potato culture pursued on the vein of black peat-bog which extends along the sea coast and near it, from Ballydonnorea to within a mile of the town of Wicklow. It is as follows.

After the inequalities of the ground have been levelled, ridges of five, and furrows of two and a half feet each are marked out, in order that three successive crops may be produced, by changing the ridge each year, converting each half in turn into a furrow, and by this means, in the space of three years, the spade will have worked the entire surface. Upon these ridges, early in September, dung is spread, 480 cart-loads (small of course, but double the quantity of general manuring) being allowed for each acre; the sets are then made rather closer than usual, and covered deeply from the furrows, which is all that is done by the spade, until the period of digging, as they are never earthed a second time; probably because the bog stuff being light, is at first spread thickly to protect the sets from the effect of frost, and is sufficient for the production of the early growth, the subsequent increase being little valued. Potatoes produced in this manner, and under the above circumstances, do not seem to require a second dressing, which is so necessary to potatoes grown in upland ground. But the chief thing to be guarded against is frost, which, notwithstanding the vicinity of the ground to the sea, and the vigilance of the farmer, sometimes injures the early and tender shoots. The mode of prevention (whenever great attention is paid to the potato crop) is, to cover the ridges at night with straw or litter, which is to be taken away when the sun gets warm, but must be replaced at night as long as the frost continues. But the usual way is to brush off the hoar-frost from the plants at sunrise, by a hay rope or light furze bushes, as it is the influence of the sun upon it that causes the injury.

Wherever the crop succeeds, the farmer commences to dig at the beginning of May, and the first parcel sent to the Dublin market remunerates his toil and skill. Five shillings per pound has been paid for the *first* load, then half a crown, and from that to the end of the season the price diminishes (according as the market is supplied) perhaps to one penny per pound.

Five pound has been received for the *first* load, three-fifths of which perhaps is clear profit to the grower. According to this, an acre of early potatoes may produce a profit of L. 50, allowing eighteen loads to the acre.

Fortunately for the farmer, the period for sending these very early potatoes to the Dublin market is that at which all his spring labours have terminated, and when, consequently, his horses are comparatively unemployed.

The species of potato cultivated for the early market is that well known by the name of *Wicklow Bangor*, originally introduced from Cumberland, whence it is still annually imported. This potato, when planted in stiff soil, soon loses its longitudinal shape, and otherwise degenerates, probably (according to a hypothesis of Sir Humphrey Davy) because in light soils it meets with no resistance to compress its form, and cause it to assume the round one.

The culture of these very early potatoes has latterly decreased considerably from their excessive demand for manure, and frequent failure from frost, which in one day would destroy the whole crop. This particular spot of the county, however, is peculiarly favourable for the experiment, from a combination of circumstances,—the nature of the soil; proximity to the sea, where severe frost is rarely experienced, and where shelter is afforded from the west and north-west winds.

The breeding of lambs for the January market is generally practised by the sheep farmers throughout this part of the county, and is managed in the following way.

" The flock of the lamb farmer consists almost uniformly of 100 ewes, kept as well as his pasture will admit of. Amongst those, eight or ten rams are put in the beginning of June. Many of the ewes will be impregnated by the end of July, it being natural to this kind of sheep to take the ram at an early season, and this tendency, on their part, becomes periodical; so that a much better chance of early lambs is had from ewes in the habit of breeding than from those untried. If, after this month, any ewes seem not to have been tupped, the anxiety of the farmer to obtain the high price of the early market, suggests the expedient of hurrying the flock about a barn or small enclosed yard, till they are considerably heated and fatigued, at which crisis a number of rams are introduced, and the ewes treated in this manner, in most instances, present the farmer, in the month of January, with the expected result of his experiment. The lambs, at a fortnight old, are separated from the dams, and placed in small pens in the lamb-house. This is by some constructed with three apartments; one divided into pens for lambs of different ages, the other two communicating with this, and also with the farm-yard; the one to receive the dams of the lambs which are in the pens, the other to receive the dams of those that have been sold off.

" Into these two divisions the ewes, as here distinguished, are respectively driven twice a-day. The dams of the lambs sold off; or, as they may be termed, the nurses, are brought out separately, and held for the lambs to suck them. They are then put away, and the lambs are let in to the adjoining apartment to their own dams. While the lamb is very young, it is incapable of using much milk, and the ewe will afford sufficient for its sustenance; but as it increases in strength, assistance from the cow becomes necessary; and, beginning with a quarter of a pint, each lamb, before it is sufficiently fat, will come to use more than a pint of cow's milk at a meal, and that twice a-day, exclusive of the milk from the ewe. The regular practice is to divide the twenty-four hours by four equal periods, and to feed the lambs with ewes' milk and cows' milk alternately, at intervals of six hours. This requires a constant attention, night and morning, and on that the success of this business chiefly depends. This attention must be directed to another object also, as well as the feeding: unless cleanliness is particularly observed, the lambs will never thrive.

"The best lamb-feeders have board-floors, contrived to let all moisture pass through, and be drained away; so that the lambs lie always dry and warm, upon wheaten straw, which is preferred to any other for this purpose. At about six weeks old, or sooner, they are fit for the butcher, and produce, according to the time of sale, from two guineas and a half to 20s. a-piece. The low prices take place at a very late season, when the ewes have plenty of grass, which increases their milk, so as to make the assistance of the cow unnecessary, but at the early season, when the ewes' milk would be so valuable, it is unaccountable that some greater exertion is not made to supply them with turnips, or other artificial food, which would preclude the necessity of encroaching upon the dairy, at all events to the present extent. The foregoing method includes all the rules observed by the chief farmers in the lamb trade,—a practice, which has caused so much wonder, and the success of which has been imputed to such various mysteries, but except in the single contrivance of the barn, which certainly is made use of, the whole is comprised in regularity and cleanliness *."

The breed of sheep in the lowland pastures (these are not very numerous) is principally of the Leicester kind, but South Downs are also numerous, and the native mountain race has been crossed with these.

The number of breeding ewes upon all the mountains of the

---

* Radcliff's Agriculture of the County of Wicklow.

county, has been estimated at 20,000; but the loss of lambs, from foxes and birds of prey, and inclemency of season, is so great as to prevent the multiplication which would otherwise arise from so large a breeding stock.

But the number might be indefinitely increased by turnip culture, for which the bases and sides of many of the mountains present the most tempting facilities. Draining, paring and burning, would neither be very expensive nor difficult. To carry lime indeed (beneficial as it would be), to any considerable elevation, would be extremely expensive, and almost impracticable, (without the aid of machinery and rail-roads), but draining and burning of the coarse grasses or heathy surface, with subsequent dressings of *peat-ashes*, always available in these districts, would neither be very alarming to the capitalist, nor unprofitable in result.

According to the Reverend Arthur Young's report, a flock of South Down sheep, consisting of 2140, was subsisted for the winter upon 50 statute acres of turnips, 80 of hay, and 20 of potatoes.

At the bases of the mountains, turnips and rape could be raised with very little labour, and would supply food for the sheep, sheltered under extensive sheds, until the season for their migration to the higher grounds, in good condition, instead of losing three months in barely recovering from the injurious effects of the winter's starvation.

There are on the summit of the Douce Mountain (in the mountainous barony of Ballinacor), and around it, extensive *prairies*, and level tracts of peat soil, which only require draining, paring and burning, to become meadows or sheep pastures, and yet there is no attempt made to reclaim these tracts.

And this is the more surprising, when it is stated, that much of this property, unquestionably about Luggielaw, belongs to the Latouche family, so much respected for benevolence, liberality, and a taste for improvement, with ample funds for any spirited undertaking of a speculative nature.

There is but one satisfactory solution for the apparent indifference of the proprietors of this tract (whosoever they may be) to an improvement of a most important character, which is this,—that these mountain lands are annexed by lease for pasture, in common to the lowland farms, and are not in the actual possession of the landlords.

If such supposition be correct, it would be desirable that the proprietors should make such an arrangement with their tenants as would facilitate the suggested improvements, and establish a system of winter-keep for a valuable flock, which, under the present circumstances, is hardly kept alive.

From the wet and marshy nature of many of the Wicklow mountains, the Cheviot sheep, as recommended by Sir John Sinclair to Mr Fraser, would probably answer best.

The Merino, as well as the South Down, has been crossed with the native sheep; but the Merino breed, for some years past, has fallen into disrepute, from its liability to the foot-rot, the extreme inferiority of its flesh, and probably from its unsuitableness to a cold and wet climate.

Mountain pasture being so extensive in this county, the late Farming Society of Ireland made great efforts to improve the native Highland breed, and, in furtherance of their object, imported many South Down rams, which they presented, during four successive years, gratuitously to the sheep-farmers, and at the same time proposed most liberal premiums, from L. 10 to L. 30 for the best pens of ten yearling ewes got by thorough-bred South Down rams on native ewes.

At Rathdrum there *was* a considerable manufacture of flannels and blankets; and at one period the average amount of pieces sold amounted to 50,000.

The late Earl Fitzwilliam, on whose estate this very neat town stands, built at his own expense a town-hall for the sale of the manufacture, which England, by superior capital, and other causes, has continued to monopolize.

We dismiss our sketch of the eastern division of the county of Wicklow, with an extract from Mr Radcliff's Report, on the mode of hay-making practised in it.

" *First Day.*—All that is mowed before mid-day, is shaken out evenly by boys following immediately after the scythe, in the proportion of one boy to two mowers.

" This, after twelve o'clock, is formed by the rake into single wind rows, at four feet intervals, which is termed *hacking*; and before night is put with the fork into very small co [illegible]

" *Second Day.*—Those cocks are shaken out in the morning, and towards the middle of the day are double hacked, or put into double wind rows, by two persons raking in opposite directions, and before night are put into larger cocks than those of the first day, in the proportion of three to one.

" *Third Day.*—The cocks are gathered into plots; are shaken out; and the ground being raked, they are turned towards the middle of the day, and, before the night, are put into still larger cocks.

" *Fourth Day.*—These cocks are suffered to lie untouched for this day, and perhaps the next.

" *Fifth or Sixth Day.*—The cocks are shaken out and turned, and the ground being raked, are put up again into cocks of four cwts. or thereabouts, in each.

" *Sixth or Seventh Day.*—The cocks are drawn into the rick.

" It may without presumption be asserted, that a strict observance of the foregoing rules will not fail to produce a crop of fragrant and well-coloured hay, unless there be an uninterrupted continuance of wet weather. In fine weather nothing can exceed or rival this most approved mode of hay-making.

" In broken or doubtful weather, the first opportunity should be seized on to throw the crop into lap-cock, instead of the larger cocks above described, which being more pervious to rain, suffer more in quality and colour from a continuance of it. If the weather take up, the original method may be resorted to, as the lap-cocks can be shaken into double wind-rows, and thence the former course proceeds.

" The lap-cock system is in itself not very inferior to the other, even in a dry season; but, in broken weather, far superior; from those little cocks, if well constructed, will turn a fortnight's rain without receiving any damage, for even if wetted through, the mass being small, fermentation will not take place, nor will the hay be discoloured as much as in any other way.

" Some hay farmers are so extensive as to be under the necessity of putting in their mowers to a certain day. Those on a smaller scale can wait the arrival of settled weather; but he who is perfectly conversant with these two systems, who can commence with either as weather points out, and who can vary from one to the other as the weather changes, has the best chance of a safe and profitable crop."

The barony of Ballinacor, which, as has been already stated, separates the eastern and western portions of the county, is principally a chain of granite mountains, containing within its boundaries and hollows some highly picturesque scenery.

The principal proprietors of this barony are Messrs Tottenham, Eccles, Seagrave and Synge.

The latter gentleman lives at Glendore Castle, in the midst of extensive woods, principally of his father's planting. The Devil's Glen, on this gentleman's estate, is one of the grandest features in this Highland scenery, and though immeasurably inferior to the awful sublimity of some Scottish mountain scenery, is well worth the tourist's visit.

The late proprietor, and we believe that the present one is an improver also, at least in the planting department, added a large tract of reclaimable moor to his demesne, which now consists of 1000 acres. This moor he improved by the application of lime from Wicklow, little more than six miles distant from it, and evinced spirit and enterprise in every branch of farming. His manufacture of cheeses was unrivalled in Ireland, and proved that there is no real obstacle to the success of an Irish cow-farmer in this department of rural economy.

The Seven Churches, one of the wild beauties of Ireland, and the property of the Archiepiscopal See of Dublin, is in this barony, but, unhappily for the improvement of a tract well suited to planting, the nature of the tenure, or apathy on the part of the tenant or the church proprietor, the banks of the lake,

> "By that lake whose gloomy shore,
> Sky-lark never warbled o'er,"

are without the ornament of trees, and the whole district is lamentably barren. Very near the lake, and surrounded by a thriving wood, there has been, within a few years, built an excellent house, with gentlemanly offices, by W. Bookey, Esq., who usually resides there.

In this secluded neighbourhood are the only l[illegible] mines hitherto discovered in the county; and here, as they issue from the pits, is heard the busy hum of men, the number of whom employed in the works is considerable.

The greater part of this barony was inaccessible until the formation of the military road about thirty-four years ago, which it was found expedient to form for the pacification of a lawless district, and this line of communication consequently affords an important facility for the carriage of lime from the town of Wicklow on the one side, and the county of Carlow on the other, and, consequently, for the exertion of speculative enterprise and energetic industry.

The western division shall now be noticed. The principal land-owners of Talbotstown barony, which constitutes the portion to be considered, and which covers an area of 143,651 English acres, are the Marquis of Downshire, and the Earls of Aldborough and Miltown.

The entire of this barony, with the exception of the western boundary, is calcareous. There cannot be finer sheep pasture than on the hills about Blessinton, which (under the good management of the Marquis of Downshire, the most extensive, and one of the best landlords in Ireland,) is a very neat and improving little town.

The tenantry here appear to be very comfortable, occupiers of good slate houses, and altogether of a superior class. Their landlord, with his usual provident attention to the wants and circumstances of his estates, has built some lime-kilns within a few miles of the town, where pebble limestone is abundant.

The strata of these round calcareous stones extend from within a mile and a half of Blessinton on the south, to Humewood, a distance of eighteen English miles. In the neighbourhood of Blessinton, as in so many other parts of the county, there is a great deficiency of trees, even where nature seems to invite their growth. Close to this town is a fine park, with the ruins of a mansion-house belonging to the Hillsborough family, and at no great distance to the south, is the noble house and demesne of Lord Miltown, on the banks of the King's River and the Liffey. Major Hornedge, and many other very respectable gentlemen, exhibit here specimens of good management and rural comfort.

The country about Baltinglass is extremely hilly, and best suited to sheep feeding; but, generally speaking, the elevations (except on the extreme eastern limits) of this barony are not considerable, though there is a continued undulation of low and long hills (containing pebble limestones) with flat summits, beautifully formed for ornamental planting. Between these hills is fine meadow land, with marl underneath. The branches and horns of the Moose deer have been found in a fossil state in the marl pits, and are preserved at Saunders Grove, the residence of the Saunders family, one of the most respected in this part of the county. The late Mr Saunders, who was an experimentalist in husbandry, and a successful planter on a considerable scale, had some extensive meadows of planted fiorin-grass on one of his moors, which produced enormous crops of hay. The details of his fiorin culture, may be thus briefly given from a more lengthened statement communicated by himself. On a moor of forty plantation acres, previously of little worth, and occupied by a tenant at 5s. per acre, Mr Saunders, having limestone gravel on the spot, pared and burned the surface, which he then covered with gravel. The substratum was cold, wet, and tenacious, and impenetrable to the plough, and had, in consequence of its extreme hardness, to be broken up by the force of a pickaxe in the hands of a strong man. This land was reduced to some degree of looseness by the management bestowed on it during two successive crops of potatoes. Subsequently, on sowing oats on a part of it, the natural fiorin-grass was observed, and this, in consequence of some published hints of Dr Richardson, was suffered to grow with the oat crop, after the reaping of which it became a fine meadow of pure fiorin.

After proving, on a small scale, the value of this previously neglected grass, indigenous to the Irish moors, Mr Saunders appropriated the greater part of his reclaimed moor exclusively to the growth of this succulent grass, and became, like Dr Richardson, an enthusiast in its favour. Fuller experience, however, has not tended to bring fiorin into estimation.

We recollect riding several miles to see a rick of fiorin hay at Saunders Grove, and were astonished at the produce of two acres. Were we to state the number of tons, we should be considered arrant *bouncers.* Boggy land, not *too* much drained, seems the most favourable to the luxuriant growth of this grass.

the Agrostis stolonifera, which is found on the margin of every bog hole. Cows are extremely fond of it, and yield milk most plentifully when fed on pastures where it abounds.

Mr Saunders was also a very successful irrigator, and proved the advantage of irrigation by the permanency of its effects. Yet there is no branch of farming more obstinately neglected in the county of Wicklow than this, even where the land is invitingly formed for watering, and the stream at command.

Stratford upon Slaney is a flourishing little village, belonging to the Aldborough family, at the base of some hills, which have been brought into a state of verdure and fertility by the skill and exertions of the Messrs Orr. The scenery here is extremely interesting, and not deficient in timber and ornamental plantations.

Humewood, the seat of one of the oldest and most respectable of the aristocratic families of the county, is in this neighbourhood, and stands pre-eminent for the extent of the woods in which it is embosomed.

The half barony of Shillelagh, containing 44,088 acres, belongs exclusively to Lord Fitzwilliam (whose entire territorial extent of property within the county is calculated to be 60,000 acres), and deserves a distinct consideration.

This nobleman, a munificent landlord, authorizes his agent, a gentleman of superior intellect and unquestioned judgment, to expend large revenues in advancing the condition of his princely estates in the county of Wicklow, and to preserve in a high state of order, the family residence at Coolattin Park, part of the Rockingham estate, and surrounded by the woods which still remain as proud memorials of those days when the whole district of Shillelagh was one vast forest.

In this barony, there is naturally no calcareous manure; much of the soil is siliceous, and some of it argillaceous; but, as the introduction of lime from the adjoining parts of the county of Carlow has been much facilitated by roads, formed principally, if not altogether, at the expense of Lord Fitzwilliam, agricultural improvement will soon result.

The old mountain roads were in the worst possible lines of direction, and traversed the summits of the hills instead of going round them. They were also made more with reference to individual and local interests, than with any view to the general utility of the district.

A new road by Coolkenno, now holds out an inducement to many car-men, to employ their horses during the spring and summer seasons, in drawing lime from the Carlow kilns, to be sold in retail in the barony of Shillelagh to the farmers. Fourteen bushels are usually measured from each load to the purchaser, at 8d. per bushel, and this quantity is bought at the kilns for about 2s. 10d.

The variation between the measurement at the Carlow kilns and in the county of Wexford is as 20 to 32. The Wexford men, in consideration of the great labour which they and their horses must undergo in the carriage of the lime to very considerable distances, are allowed a much larger degree of measurement than the natives of the lime country are usually indulged with, still the profit after all the time and fatigue of the transfer from the one county to the other is rarely remunerating. A very fine church and excellent school-houses have been recently built at Shillelagh, which is a very Protestant district, at the sole expense of Lord Fitzwilliam, and at Carnew, a populous town within four miles of Coolattin Park. There are also excellent school-houses (filled with scholars), built and endowed by Lord Fitzwilliam, who also provides the rector of the parish with a very commodious and extremely handsome house, enclosed from the street with castellated walls and gateways on a very *aristocratic* style.

In this town, several excellent houses have been lately built for labourers, and to each of these is attached half a rood of garden ground on the plan recommended by the London Labourers' Friend Society.

The leases granted upon the property of Lord Fitzwilliam are for twenty-one years or one life, but such is the confidence which the land occupiers have, in regard to tenants' right under a family of undoubted honour, that they have planted and otherwise improved their farms as if they held them in perpetuity.

Some of these tenants hold very extensive tracts of land, and these (until recently prevented) they have been in the habit of encumbering with settlements for widows and children, and also of sub-letting to a great extent. These are obviously anomalies which should not exist, and which the present possessor of the estate, is determined to remedy without infringing on any reasonable demands or alleged rights of the tenant.

Wherever an under tenantry come by the expiration of a lease under the control of the landlord, they are made his immediate tenants, if he can provide for them as labourers on his lands, or he locates them at his own expense in America; if he cannot dispose of them by either of these modes, he obliges the tenants whose ancestors had encouraged this pauper population, to give them an adequate portion of ground at the same rent which they themselves pay, and also to consider *themselves* under the moral obligations of landlords to these poor people. This is all equitable, as it would be unjust to throw the entire responsibility of providing for these ci-devant subtenants on the head landlord, who had never derived any advantage from their location on his estate. To a certain extent the landlord should suffer in such a case for previous inattention to the condition of his property, and the conduct of his tenants; but the latter, who had all the benefit of the subletting system, should in equity bear the heaviest portion in the consequences.

With regard to the short period of the leases on Lord Fitzwilliam's property, we must make a passing observation. In England a lease of seven years (usually renewed when about half expired) is found by experience to be sufficiently encouraging, and advantageous to the mutual interests of landlord and tenant. If the covenants be adhered to, the land is always in good condition, and the tenant knows that he will continue to be the occupier. The influence of public opinion and general usage insure him a renewal, if he does not wilfully deteriorate his farm, and neglect the conditions of his lease. Now a lease of twenty-one years is both too long and too short; it is too long for the exertion of an immediate and salutary control on the part of the landlord, and too short to induce expensive improvements, and towards its termination, from a *want of confidence in the landlord* (too frequently), the tenant impoverishes his land as much as possible, and allows his house and offices to assume a dilapidated appearance, for the very purpose of obtaining a renewal on favourable terms.

In Ireland the *small* proprietors would increase their demands of rent in proportion to the improvements executed by a tenant, and to his indications of capital, accumulated by honest and persevering industry. We prefer a seven years' lease, renewable, as in England, before its termination, or no lease, to one of twenty-one years, and are confident that the estate of Lord Fitzwilliam has been injured by these leases. The more ordinary tenure of thirty-one years, and one or two concurrent lives, is more suited to the circumstances of the land, and obviously more calculated to induce an outlay of capital in spirited and permanent improvements. As long as it continues customary for the tenant to build his own houses, and to drain, fence, &c. at his own expense, it is reasonable that he should be secured by a long lease from the contingency of capricious or vexatious exactions on the part of his landlord.

In proof of the extreme confidence which is entertained by the tenants of the proprietor of the Shillelagh barony, we may especially notice the improvements of the late Rev. Richard Symes at Ballybegs. This gentleman has rendered what was a mere mountain farm (of 1500 acres) a beautiful demesne, with about 50 acres of plantation, and some splendid ornamental timber. Long before Sir Henry Stewart introduced his successful mode of transplanting well-grown trees, Mr Symes had practised the same system in his lawn, where he formed a plantation, which at once exhibited an appearance of several years' growth. His preparatory practice in the nursery was frequent transplantation, by which vigorous and abundant roots were formed, so that they were taken up with such a large ball of earth as to obviate any chance of failure.

Captain Nickson of Munny, deriving an hereditary interest on the same estate, has evinced much zeal in planting trees on a very great scale; but, like many other planters, he wants resolution to thin sufficiently.

Tombreen, the residence of the Swan family, is another large and improved farm, the soil shingly and shallow, rendered productive by a liberal application of manure. The late possessor had at one time 150 acres in tillage, with a fair proportion under turnips, raised with peat and lime mixed. He stall-fed [illegible] head of cattle, and had 130 Leicester ewes.

Doctor Derinzy is another tenant, holding 600 acres, and very improving. In all these farms much mountain land measured in, but it is all fit for sheep-feeding, and might be rendered highly profitable,—as already stated in similar cases,—by the adoption of turnip husbandry.

The growth of clover has greatly increased in this barony within a few years.

With respect to the culture of the romantic demesne and farms in the occupancy of Lord Fitzwilliam, some notion may be conveyed by the following extract from a recent number (for January 1835), of the Irish Farmers' Magazine.

" With the kind intention of affording the means of support to some hundreds of labourers, Mr Chaloner (the admirable agent for Lord Fitzwilliam's Irish estates), gave directions, about five years ago, to Mr Mills, a Scotch steward, who has so successfully executed the work, to drain and trench between fifty and sixty plantation acres of bog land, from which the peat had at different periods been cut away. This land had been set for half-a-crown an acre,—its full value, too, when I saw it at the period referred to,—and presented a frightful surface, uneven from old bog holes, and in some parts so full of confined water as to shake under the slightest pressure. I was present at the commencement of the improving operations, which were thus conducted:—Gangs of six men each (the foreman included) were appointed to trench this unpromising piece of land. This trenching they executed by marking with a line a cut three feet wide; turning over the subsoil with a spade to a sufficient depth (taking care to keep the comparatively good portions of the soil near the surface), and having the lower strata loosened to the same level as nearly as possible. A variation of depth in the trenching was required, from the great irregularity of the surface, but the average depth may be stated at 22 inches. In order to drain the land effectually, and to keep the same under-level, it was necessary in many places to penetrate to the depth of four and five feet. The portion of work which each gang was able to execute easily, was a trench 72 feet in length, 3 feet in breadth, and (on an average) 22 inches in depth.

" If this quantity of work was either exceeded or not executed in the day, an increase or diminution of the day's wages varied accordingly. The cost of this trenching alone amounted to L. 25 per acre; and the other expenses of draining, levelling (with a kind of mouldebaert), ploughing, harrowing, stone gathering, manuring with lime and farm-yard dung, seeds, &c., are estimated by Mr Mills at L. 50 more per acre, making the total expense L. 75 per acre. The drains have been executed in a noble style, varying from 6 to 15 feet, with a sunk fence (a drain) for a boundary on one side, 23 feet in width and 8 in depth, paved at the bottom, and faced with a very handsome stone wall. But the returns from the two first crops of turnips and potatoes, succeeded by oats, amounted to L. 40, these crops being very luxuriant; and, subsequently, the grazing of heavy cattle for the butcher, and of brood mares and their foals, must have been highly profitable; and I have been lately assured that L. 16 per acre would be cheerfully paid for two successive years, if this rich and consolidated lea land would be let for potatoes. If this latter species of rack-rent economy were to be pursued, the original expense (which by the way, was much greater on account of the ornamental stone work than an ordinary improvement would have incurred) would be speedily cleared.

| | | | |
|---|---|---|---|
| Total expense per acre, | L. 75 | 0 | 0 |
| Interest of L. 75 for nineteen years (period of Scotch lease), | 30 | 10 | 6 |
| ent, when unimproved, for nineteen years, at 2s. 6d. per acre, | 2 | 7 | 6 |
| | L. 107 | 18 | 0 |
| When the land is improved, say 12 barrels wheat, at 25s. per acre, | L. 15 | 0 | 0 |
| Straw, | 2 | 10 | 0 |
| | L. 17 | 10 | 0 |
| When laid down, the land will graze 10 ewes and 10 lambs. | | | |
| Wool of 10 ewes, | L. 5 | 0 | 0 |
| Lambs, | 10 | 0 | 0 |
| Profit on ewes sold at end of year, | 2 | 10 | 0 |
| | L. 17 | 10 | 0 |
| The same rate will produce for 18 years, | L. 315 | 0 | 0 |
| Eighteen years' interest of the whole put yearly into the bank, at 2½ per cent. | 84 | 17 | 6 |
| | L. 399 | 17 | 6 |
| Expended, | 107 | 18 | 0 |
| Profit on one acre in nineteen years, | L. 291 | 19 | 6 |
| One hundred acres in nineteen years on this scale would amount to, | L. 29,197 | 18 | 4 |

"Fractions are not estimated in the interest; but the calculations are correct in round numbers, though perhaps somewhat too favourably made. But the foregoing improvements, great as they are, constitute but an inconsiderable proportion of what has been subsequently done, and is still in progress. A tract of 350 acres is in course of culture; of this, 30 acres have been recently trenched with the spade, as in the former instance, and much of the remainder has been trenched with a plough drawn by six able horses. This implement, which, from its superior weight and strength, cost L. 16, turns out of the land even large blocks of stone, which are carted off, and carefully arranged into very long and straight double walls, with a row of thorn-quicks planted in the intermediate spaces. This work is performed by common but handy labourers, two of whom build a running perch, about four feet high, in the day. The plough in some parts reaches to a depth of 16 inches, and the drains in the hollow part of this great tract are on a grand and effective scale.

"Considering the previous worthlessness of this piece of land (under the wretched management of poor and bad farmers), it will become highly profitable in a short time, producing, as was the case last summer, enormous crops of barley and wheat on the reclaimed parts; and it will ever afford a practical illustration of the immense good which spirited and wealthy proprietors can effect in this country, either through their own directing and superintending care, or through the instrumentality of such a talented and accomplished agent as Lord Fitzwilliam's estate is blessed with."

## ON THE ADVANTAGES OF SMALL FARMS.

By Mr William Blacker, Armagh.

I feel no small gratification in observing the favourable opinions expressed in this journal and by Mr Blackadder, at pages 336 and 630 of 5th vol., in regard to the two small pamphlets I have ventured to lay before the public.* The subjects therein treated of are certainly of sufficient importance to interest a large portion of agricultural readers, and might well deserve that larger volumes should be occupied in their discussion. In particular, it is of the greatest national consequence that landlords should be made sensible of the great loss to themselves and their families, as well as the injury inflicted upon their country and their fellow-men, by neglecting to improve the agriculture of their estates. If the attention of landlords in Ireland was perseveringly directed to these objects, their agents, I have no doubt, would be ready to lend their best assistance, and Scotland would supply any number of agriculturists that might be required for giving the necessary instruction to our ignorant peasantry; but the fact is, very few Irish landlords have heretofore shewn much taste for such pursuits, and until they do, it is not likely that those in their employ will be led to use exertions which they are not required to make, and which their being frequently non-resident would render very difficult to comply with even if they were, nor would their exertions avail much, unless the landlord was content to make the pecuniary advances absolutely necessary to give success to their endeavours. I have been led into these observations by the perusal of the preliminary remarks on my Essays, in which I think the writer has not pointed out as forcibly as I could wish, that the *landlord* must be the person, generally speaking, to give both the means and the stimulus to improvement. Where *he* is anxious and judicious, the greatest difficulties will give way, and every step gained will be found to make the following more easy of accomplishment.

---

* Prize Essay addressed to the Royal Dublin Society, on the Management of Landed Property in Ireland, &c. Dublin: W. Curry jun. & Co. Edinburgh: W. Blackwood & Sons. London: Rodwell. 1834.

An Essay on the Improvement to be made in the Cultivation of Small Farms, by the Introduction of Green Crops, and House-Feeding the Stock thereon. Dublin: W. Curry jun. & Co. Edinburgh: W. Blackwood & Sons. London: Rodwell. 1834.

The plan I have advocated in the prize-essay addressed to the Royal Dublin Society, which Mr Blackadder has noticed, is, as it appears to me, most completely confirmed by the successful experiments he has detailed. In now addressing my readers, therefore, I have only to combat the objection to which I find we have both been exposed, namely, " the anticipated increase of the population," and to set myself right with him as well as in my power, by a further explanation of those opinions, in which I perceive we do not entirely coincide. The charge of increasing the population, which many consider synonymous with the increase of pauperism, it appears from his statement, was made against his plan of locating the supernumerary tenants on Sir James Carnegie's estates by the neighbouring landlords, and the same objection has been made by many of those with whom I have had discussions on the subject *here*. Now, in the first place, our plan is certainly free from the guilt of bringing this surplus population into existence, because they must have existed before they could have been located ; therefore (admitting for the moment the supposition that the population was likely to be increased by the location), it may, I think, fairly be asked, is it expedient that these people now existing, should be debarred from earning a comfortable livelihood merely from the theoretic apprehension that their descendants might be so increased in number, as not to be able to find the same independent subsistence? I would assert that no theoretic fear of the kind ought to induce us to deny to our fellow creatures the benefit of that provision for their wants which Providence places in our power to afford them, not only without injury, but with absolute benefit to ourselves. This is fully proved by Mr Blackadder's experiment, when he states the allotments on which the poor people he speaks of were located, would be worth at the expiration of their lease as many pounds as they were worth sixpences at its commencement, the tenure being only for a term of nineteen years. If this profit would not satisfy the most avaricious I do not know what would; and it appears to me, that no person of sound judgment or good feeling, (admitting, as I have said, that the population would be increased thereby) could for a moment regret that Sir James Carnegie, acting under what I should term the enlightened views of Mr Blackadder, had made so many industrious people comfortable and content with so much advantage to himself as well as to them. But I think it may be very fairly disputed whether the population will be thereby increased. There is abundant proof in Ireland that the poverty of the parents by no means tends to diminish the progeny; on the contrary, it seems to have a quite opposite effect, and the largest families are almost invariably found to belong to those who appear to have the smallest means to support them, and not only this, but the earliest and most imprudent marriages generally take place in the same class of society.

I believe many instances might be adduced in Ireland where two young people marry without having the means of purchasing their wedding dinner, and it appears to me that the distaste for forming such imprudent matches is in exact proportion to the comforts they are brought up in the enjoyment of; for we find that when we turn our attention to the upper classes, according as we ascend the scale of society, the more cautious people become; and matrimonial connections are rarely formed, without sufficient provision being secured for bringing up a family; and those early and imprudent marriages I have alluded to, are almost never met with. According to this view of the subject it may be reasonably doubted whether the population would increase in the manner asserted by such objectors; but suppose it did, what have we to fear in either England, Ireland, or Scotland? It appears by Mr Blackadder's statement that a tract of 300 acres of the most unprofitable muir, not worth at the time above sixpence an acre, had been divided into five-acre farms, which are now occupied by a thriving and industrious tenantry, and would be worth a pound an acre at the termination of a nineteen years' lease, a most advantageous allotment for the landlord certainly. But not to wander from the question at issue, let us see how many souls these 300 acres of barren muir are made to accommodate. This tract, divided into five-acre farms, must give sixty farms, and each family being supposed to consist of five persons, young and old, here is a location of

300 souls, being exactly one to each acre. Now, let any one that is afraid of being over peopled, calculate the waste lands of England, Ireland, and Scotland, supposed equal to thirty millions of acres, which, on an average, are much better than the tract which Mr Blackadder speaks of; take these as being able to accommodate merely the same proportionate population, and all fears of being over-peopled must, I think, vanish, even supposing population to increase twice as fast as it has done.

Supposing, therefore, this objection to be set aside, and I never heard of any other objection having ever been brought forward, and that this experiment, which my own experience entirely corroborates, should be considered as quite sufficient to demonstrate the *practicability* of the allotment system, it seems to me a waste of words to proceed to prove its *utility*, which must appear self-evident. I therefore pass on to the consideration of those points in respect to which Mr Blackadder appears in some degree to differ with me in opinion; and, first, as to the eligibility of landlords preserving their properties *at present* in large farms. I think in this respect Mr Blackadder has in some degree mistaken my meaning, for I do not deny that large farmers have introduced improved cultivation into Scotland; it is merely the advantage of large farms in the *present* day which I venture to doubt. During the war, and under the influence of paper currency, the prices of agricultural produce were so advanced, that capital was attracted to the cultivation of land, as I conceive, in a manner wholly unknown to former times. As long as these high prices lasted, matters went on very well, but when they ceased, the rent was found to be more than the tenant could pay out of the produce of the ground. In the mean time, the landlords, whose expenses pretty generally kept pace with the increase of their rentals, and whose estates were, for the most part, burdened in a like proportion, were unable to abate without submitting to great personal privations. The reduction of rent, therefore, has been made with a sparing and very reluctant hand, and generally speaking, has not been lowered at all in proportion to the fall which has taken place in agricultural produce. It appears to me from many concurring testimonies, that the rent of land at present does not afford more than a bare subsistence to the cultivator, and has not by any means been reduced so as to enable tenants who had the command of the capital required for the occupation of these extensive concerns, to live suitably to their class in life. Accordingly, the capital that was formerly attracted to agriculture is now apparently, for the most part, either lost or withdrawn from agricultural pursuits; and, if I am informed right, landlords have now only the choice of dividing their farms so as to meet the circumstances of an inferior class of tenants, or else to reduce the rent to tenants of larger capital, much below what might be obtained if the farms were made of a smaller size. It is self-evident, that in large farms, the distance of the premises from the farm-yard occasions an amazing addition to the labour in carting out manure and carting home the crop, and that a farmer of this kind must do every thing by hired labourers. *He* must also live in a superior station, and *his family* also. He must likewise have some return for the large capital he is obliged to employ, besides being repaid the amount of his outgoings. Now, according as the size of the farm is reduced, the *proportion* which all these outgoings bear to the produce, is changed much to the advantage of the small farmer; his farm is more compact, less capital required, and the labour of himself and his family become in every stage more and more available to the management of the farm, to the exclusion of hired assistance, until it comes down to the actual size which the occupier's own family can manage. At this standard, the capital required is small, and the style of living is not greater than what the wages of the family will support; and an occupier of this kind can live more comfortably in his situation in life, and have a larger disposable produce to meet the rent than any other class of cultivators. A man working for himself will do twice as much as the man who has to hire a labourer will get accomplished. His wife and daughters can manage the dairy, and attend the soiling of the cattle, and the outgoings are reduced to nothing.

As, therefore, landlords, as a body, are, like other men, and generally swayed by their own interests, the result, I think, from the reasons I have given, must be, that the gentleman farmer will be obliged to look for some other occupation, and the landlord will choose the tenant who will pay him the highest rent;

in fact, let wheat go but a little lower, and the gentleman farmer can pay no rent at all, even for medium land already reclaimed and brought into cultivation. If, then, the present state of things will not sufficiently repay the capitalist for the cultivation of land which has already been brought under the plough, it appears quite clear, that any progress *hereafter to be made in the improvement of waste lands, must be made by the working cultivator; or, in other words, by the small farmers.**

Mr Blackadder's own experiment tends to prove this; for what man of capital would have embarked in reclaiming the 300 acres he speaks of? Certainly not one. I, however, wish it to be understood, that in arguing for the small farmer, I always suppose him to have the skill and the means to crop his land properly; if he has not these, he must be supplied with both the one and the other, which the plan I advocate is calculated to furnish, and with which Mr Blackadder has also provided for his crofters. The plan pursued in England, of keeping tenants' houses in repair, militates very much against small farms; and, as far as I am a judge, ought to be changed. A *tenant* will keep up his own house on much easier terms than his landlord can possibly keep it for him; and it would be for the interest of all parties, that *he* (the tenant) should be bound to do so. If this impediment to the introduction of small farms were removed, the difficulty of finding tenants for *large holdings*, and the increased rent obtainable for those of a *reduced size*, would lead me to think, that a rural population, and a robust peasantry, would again form the strength and the boast of Great Britain, and, joined with the allotment of the commons and other waste lands, would banish pauperism and poor rates from the empire.

Having said thus much in favour of my views as to small farms, I shall venture to allude to another point, in which Mr Blackadder thinks I have rather gone too far in my recommendations, viz. In regard to the Legislature having a right, for the benefit of the State (after making compensation to the owners), to take possession of the waste lands belonging to individuals who leave them in a state of nature. Mr Blackadder is by no means singular in this opinion, as many on this side the Channel, I have found, of the same way of thinking; and it seems to me as if there is a very general idea prevailing, that every man is at liberty to do as he likes with his own, in the most unlimited sense of the expression. This might be very true, if man was a solitary being, shut out from communication with his fellow creatures; but if he enters into society, these abstract rights must be given up; every law that is framed is for the express purpose of taking away some one or other of them. The very notion of a Legislature is, that the rights of individuals should thereby be made to yield to the general good of all. Thus, the Legislature may take my house and throw it down to widen a street,—may make a road through my garden, or a canal through my pleasure ground; the Legislature may also take part of my property, as much as may be thought necessary, a twentieth or a tenth, or any other proportion, in the shape of a property or income-tax, or in any other shape it may be thought best. No one dreams of denying the right; all that is required in such cases is to prove the expediency; and not in only this, but even in matters one would suppose entirely optional; for instance, if an individual had a quantity of gold coin, and for the convenience of carriage, or safe keeping, should wish to melt it down, I believe the law would punish him for so doing. Therefore, if, in all cases, and in all things, the will of the individual cannot be put in competition with the good of the nation, what argument can possibly be urged in favour of allowing any individual or any number of individuals, to keep land lying waste which the good of the state requires should be allotted for the employment of the pauper population?

---

* The evidence given before the Committee of the House of Commons in regard to the enclosure of Bucklebury Common, tends strongly to confirm this opinion. It is there stated by the Surveyor examined, if I recollect right, that it would take L. 25 per acre to reclaim the Common; but it was admitted that nevertheless all the small-holders had brought their little enclosures into the highest state of cultivation. The subject was alluded to in the morning papers of the 9th May 1834. The Morning Herald, I believe, gave the fullest report of it.

Is there not the strongest possible necessity clearly visible for the exercise of such a power in the situation of the working classes, unable to obtain any of the comforts of life, and becoming, from their privations, reckless of consequences, and dangerous to the community? Why should the country be impoverished by poor's rates, when the poor might thus be made to provide for themselves?

There is no reasonable argument that I can see, which can at all be urged against it; but although I claim for the Legislature the *right* to interfere with individuals, I am far from thinking it would even be necessary generally to have recourse to such an alternative,—the commons and other lands of that description, would long afford an ample supply;* and even if the present indolent habits of the land-owners should be handed down to future times, and necessity compel the Legislature to avail itself of the right contended for, it seems morally certain, the very first act of interference with private property would create such an apprehension among landlords, in regard to the risk of losing their property, that no second enforcement of the right would afterwards be found necessary. The *hint* would soon be taken, and every landlord who had land to reclaim, would be found as assiduous in reclaiming it, as the most ardent reclaimer could desire. It is easy to foresee, that in such a state of things, the Irish labourer would find ample employment in his own country,—there would neither be occasion for poor laws to secure him subsistence and employment at *home*, or to *prevent* him from going to seek for them *abroad*. The poor Irishman has not heretofore been a wanderer by choice, and if he can find the necessary employment in his native land, there is not the least chance of his travelling elsewhere in search of it. It is upon this principle alone, that the English labourer can be relieved from Irish competition, for although a modified system of poor laws is always talked of for Ireland, it is quite evident that no such system can have any *such* effect (as the very worst features of the English poor laws only apply to the case), and it seems very problematical whether any such effect is desirable. It seems almost absurd to hear as is often the case from the same individual, the loudest complaints made of the distresses of the English farmers, and, at the same time, against the influx of Irish labourers. Such people do not see that if the Irish labourer was kept at home, the English farmer must labour his land just so much the more expensively, according to the advance in labourers' wages, which must naturally take place in consequence. It seems, therefore, quite evident, that banishing the Irish labourer cannot serve both these classes. The *high wages* to be paid by the farmer might indeed be of service to others, who have hitherto been taxed for the support of those poor who would now be relieved thereby, such as householders, &c., but how the farmer himself, who is generally held out as the person most to be pitied, can be prevented from suffering, is what I do not see. In fact, it appears to me that public opinion is quite astray in considering the poor laws as a burden on the tenant; the tenant of land has nothing whatever to complain of in regard to them, except in case of their increasing during his lease beyond the calculation made at its commencement.

---

* It is by no means necessary to make allotment for every man wanting employment, who is now obliged to apply to the parish for relief; take away 20 per cent. from the number of paupers, and you leave ample employment for the remainder.

The *existing* charges, rates, tithes, and taxes, are all allowed for in the calculation of the rent; and the farmer having *deducted* them in his dealing with the landlord, cannot grumble at being held *responsible for the payment.* The consignee of a cargo of merchandize, might as well grumble at paying the freight and charges, which he deducts out of the proceeds of the goods when settling with the owner. The farmer must always expect to pay the full and fair value of the land, on account of the competition which exists; and he never can *long* continue to pay more, for the most conclusive of all reasons, namely, that he has nothing to pay it with for any great length of time. All improvements in the cultivation of land, all diminution in the charges or burdens affecting it, whether by the extinction of tithes, lowering the poor-rates, repeal of malt tax, or in any other way, must eventually issue in the profit of the landlord or owner of the *property*, the value of *which* is thereby enhanced, and the benefit to the tenant can only last during his present tenure, or it may enable him perhaps to retain a holding which otherwise he would have had to give up. Nothing can ever make land cheaper intrinsically to the tenant, that is, give him a greater share to himself of the produce in return for the cultivation, except the same method which makes all other articles cheaper, namely *by bringing more of it into the market.* At present there is a kind of monopoly of landed property, and the demand for it is greater than the supply,—to use a homely illustration common in Ireland, " *There are more pigs than teats,*" which *forcibly represents* the case as it is now with the unfortunate peasantry of Ireland and the land allotted them; but let there be a few millions of acres additional brought into the market by the legislature, apportioning among them the lands lying waste, the poor tenant has then *another shop to go to*, and he can say to the landlord, I can get land cheaper elsewhere. I cannot here represent the benefits of such a measure so much at large as I have done in the 5th and 6th chapters of the Prize Essay; but I may shortly state, that it would every where put an end to the extortions of middle men and land-jobbers, by affording to the poor people whom they oppress an alternative which they would not be slow to avail themselves of. The *liberal* Irish landlord would see his estate relieved from that minute subdivision, with its accompanying misery and wretchedness, which it pains him to behold. What are called rack-rents would cease, for no one would be under the hard necessity of submitting to them, and the cottier would be glad to dispose of his holding for what he could get, in order to remove to his new allotment; thus increasing the farm of the purchaser who remained behind, in proportion to the capital he had to lay out. Whatever obloquy may have been thrown on the *Irish* landlord, I venture to assert that on all the *principal estates in Ireland*, if the four-course rotation of cropping was introduced, the tenant could pay his present rent, and have double as much of the produce to himself as the English valuators allow in their calculations to the English tenant. I therefore do not see that the result of the measures I recommend would reduce *their* rentals, though it would most materially improve the condition of their tenantry. But it is necessary to advert to the case of the *English* landlord. *He*, it is admitted on all hands, is at present very badly off,—his tenants are, generally speaking, unable to pay him their rents,—and they may be expected to be still less able when labourers' wages shall be increased, as they must be by the plan proposed. How is he then to exist? How can he pay his taxes, or keep up his present rank in society? In reply, I fully admit he must *reduce his rents to his tenants*, but he will nevertheless find *his rental increased*. Should the legislature adopt the plan proposed, poor-rates would be reduced to [illegible] mere trifle, by enabling the poor to support themselves. T poor-rates, therefore, would not *then* be deducted off the value of his land as they are *now*; and, therefore, although the tenant comes in for a better share of the produce, yet as there is a larger nett produce to be divided, the landlord will get more than he ever got before. Thus all are benefited by this simple operation. The crofter (to use the Scotch term) is bettered, by being removed from pauperism to a state of independence,—the labourer who is left behind is benefited, by being able to procure better wages, and will get rid of Irish competition, by the Irish peasant being located upon his native soil,—the tenant is benefited, because he gets a better share of the produce, or, in other words, gets his land cheaper, by the competition being lessened, owing to the increased quantity brought into the market,—the landlord is benefited, by having his estate relieved from poor-rates, which was a tax upon his rents,—and the state or empire at large is benefited *doubly*, not only by the productive labour of so large a portion of the population, but by being relieved from the support of so large a number in a state of idleness, which is a drain upon the income of the country equal to two-thirds of the entire support of its naval and military establishment; and not only this, but the general prosperity amongst all classes would so increase the produce of the present taxes, that the most objectionable might speedily be reduced. If there was any great difficulty in making the experiment upon a small scale, there would not be so much cause for surprise that the trial had not long since been made; but the fact is, that there is no obstacle whatever, nor any great expense in making the experiment, nor can even any loss of importance arise from its failure.

Let the paupers be taken from the parishes surrounding any common,—give them the assistance necessary to raise huts of the most humble description, merely sufficient to afford protection from the weather,—pay them wages for the inclosing of their respective lots, and making such other improvements as the agriculturist may direct, until their crop affords them subsistence,—then start them on their own account at a *moderate rent*,—leaving their *future* advance to comfort and competency dependent on their own endeavours,—lending them whatever is necessary to promote industry and exertion, every farthing of which they will be able thankfully to repay,—and the promoters of the experiment will soon have the pleasure of seeing them raised to independence by the fruits of their own labour, and all the benefits I have stated following in succession.

The warmth of my feelings in the cause has already led me far beyond the limits I had originally proposed to myself, yet I must still farther transgress, whilst I beg of my readers to conjecture the feelings with which Sir James Carnegie and Mr Blackadder would survey their location on Montreathmont Muir,—beholding 300 human beings indebted to them for comfort and independence, and contrast them with the reminiscences of those who, acting on the cold-hearted calculating cruelty of the clearance system, have *put in sheep to fatten, and put out men to starve.* When viewing their flocks scattered over the hills, still marked by the ruined dwellings of their former inhabitants —inhabitants who have long since, perhaps, sunk under the accumulated sufferings of exile, misery, and want—inhabitants who, with all their faults, might perhaps have been reclaimed to industry and exertion, had Providence placed them under the fostering care of a Sir James Carnegie, and the judicious management of a Mr Blackadder.

But these reflections which I have been led into, by what I observed during a tour in the Highlands last year, I fear can have little influence on the past—let us only hope, that the example thus given of profitable location, may prevent the recurrence of such proceedings hereafter, and let us join in holding up for imitation Sir James Carnegie and Mr Blackadder as being the first to plan and the first to execute so benevolent and so beneficial an undertaking—let us hope the time is not far distant, when the legislature of the empire may take into its serious consideration the provision here pointed out for its pauper population, and that we may yet live to see from the adoption of the allotment system those happy anticipations realized in which I have ventured to indulge.

# ON THE BRITISH PLANT-LICE, PARTICULARLY THOSE WHICH ARE DESTRUCTIVE TO FIELD AND GARDEN CROPS.

By James Rennie, A. M., Professor of Zoology in the King's College, London.

Though plant-lice (*Aphides*) are, in these temperate climates, next to the locusts of warm climates in their destructiveness to growing crops, yet is a knowledge of their history but very imperfectly diffused, both among many professed naturalists, and among most farmers and gardeners, who annually suffer considerable losses by their depredations. The fact can scarcely be credited, that, notwithstanding the thousands (I might perhaps say millions) of money which have been lost to hop-growers, and to the national revenue derived from the duty on hops, occasioned by the ravages of the hop-fly (*Aphis Humuli*), I can discover no published figures nor description of this insect in any work in any language, either scientific or practical. The very name is omitted in the most extensive scientific catalogues of British insects; while the bean-dolphin or collier (*A. Fabæ*), also a very destructive insect of the same genus, though named, is neither figured nor described. These facts are certainly not very creditable to our literature.

In the details, again, which have been published, the most erroneous and unfounded fancies are given with all the authority of facts; and practical men are mystified, and put upon wrong courses of prevention, by those who might have been expected to set them right.

The following endeavour to supply a few of the more important details that may, I trust, be in general relied on, is confessedly in many points very imperfect; but it may stimulate others to make farther inquiries, in order to discover what is still unknown, and to elucidate what is mysterious and obscure, by careful observation. It is my wish to bring together all the facts which lie scattered about in numerous works, both foreign and British, and to add to these such observations as I have myself made respecting these insects;—a task which has not, so far as I am aware, been hitherto attempted in any language, though its utility to every man engaged in cultivating the soil must be very obvious. I shall begin with the general history of Plant-lice, and conclude with such descriptions of the species as I can find recorded in works of science.

*Pairing and Reproduction.*—With respect to pairing and reproduction, the plant-lice are the most singular animals yet known. M. Reaumur was at first led to believe them to be hermaphrodite, like snails and earth-worms, till M. Bonnet of Geneva in some degree cleared up the difficulty. Upon the leafy branch of a spindle-tree, plunged in a phial of water, and set in a garden pot, M. Bonnet placed a plant-louse (*Aphis Euonymi*), which he had seen born the instant before of a mother without wings; and having previously examined the leaves and stem with the most minute care, lest there might be any other aphides upon them, he covered the whole with a glass vessel, the edges of which being plunged into the mould, he felt confident that he had the control of the conduct of his prisoner. This was done on the 20th of May, at five in the evening; and he continued to watch, with a magnifying-glass, the imprisoned insect, every day, from hour to hour, beginning about five in the morning, and leaving off about nine or ten at night, writing down its every movement. It changed its skin four times, in the same manner as caterpillars, and accomplished its last moult without accident; and at seven o'clock on the evening of the 1st of June, it gave birth to a young one, and up to the 22d of June inclusive, it produced altogether ninety-five, all alive. The size of the mother became at this period much diminished, and M. Bonnet's subsequent observations were cut off by her escape; but he sent the result of these observations to Reaumur, who read them at a sitting of the Académie des Sciences at Paris. It produced an extraordinary sensation among those who were interested in such pursuits; and as it was desirable that a deviation so very singular from the common laws of nature should not rest upon individual testimony, however respectable, the experiments and observations were repeated and varied in every possible manner, at the request of the Academy, by a number of the most distinguished naturalists then living, namely, M. Bazin of Strasbourg, MM. Lyonnet and Trembley at the Hague, by M. Bonnet himself at Geneva, and, in fine, by M. Reaumur, who says he would have justly merited reproach if he had neglected to see with his own eyes experiments undertaken at his request.

The Strasbourg naturalist M. Bazin was fortunate in selecting the species which feeds on the poppy, as the young arrive at maturity in seven or eight days, and they are, besides, not apt to ramble far from the spot where they are born. A young aphis of this species accordingly, of which M. Bazin witnessed the birth on the 29th of July, was secluded upon a poppy leaf, and by the 7th of August it had brought forth seven young ones. In similar trials with others of the same species, as well as with the aphis of the rose, the same results followed.

M. Bonnet, stimulated by his discoveries, pushed the investigation still further. He commenced with the magpie aphis of the elder, secluding not only an individual at the moment of its birth, but one of its progeny, and so on successively, till he saw the fifth generation produced without any intermediate pairing; and the young of the latter brood, he had reason to believe, might have been equally fertile, had it not been in the winter, when he could not procure a fresh elder branch for nourishment. In a subsequent experiment with the large species which feeds on the bark of the oak, M. Bonnet carried his observations as far as the ninth generation, which were produced in three months, the males being throughout rigorously excluded from the nurse-boxes in which the females were imprisoned. Lyonnet made similar experiments with the aphides of the willow, but without recording the number of generations produced, his object being to ascertain whether they ever paired at all, like other insects, or whether, as M. Trembley had imagined, they paired before birth. Both Lyonnet and Bonnet distinctly ascertained that Trembley's notion did not accord with fact, for after a time the fecundity of the females becomes exhausted, and pairing is then as indispensable to render them fertile, as to any other animal. It is very singular, however, that the female after pairing is not viviparous, that is, does not produce living young, but eggs, or, as M. Bonnet was inclined to think, a species of pupæ like eggs; whereas the insects which are thence disclosed produce living young ones without pairing, and, more wonderful still, all these broods are uniformly females, no males being produced till the pairing season, which is towards the close of summer or autumn.

According to M. Kyber, the clove-pink plant-louse (*Aphis Dianthi*) will produce nothing but females for four years in succession, without pairing with any male, provided the individuals be kept in a warm chamber. This also he found both prevented the production of males and the laying of eggs in the autumn, confirming the observation of M. Bonnet, that it was the decrease of temperature which occasioned the laying of eggs as the winter approaches. (*Burmeister*, *Handbuch der Entom.* 335, who quotes *Germar*, *Mag. der Entom.* i. 2. 14.)

M. Duvau observed some individuals during seven consecutive months, and obtained eleven generations without pairing. He observed an individual obtained from the ninth generation, from the 29th September till the 19th December. (*Mém. du Muséum*, t. xiii.)

*Fecundity and rapid Increase.*—The double mode of reproduction in the plant-lice, supposed by Dr Darwin to resemble the buds and seeds of trees, will serve to account for the very astonishing increase of these insects. Dr Richardson, in the plant-louse of the rose (*A. Rosæ*), reckons in one season ten generations, each generation averaging 50 individuals, so that, by multiplying 50 nine times by itself, one egg will give origin to the almost incredible number of 25,065,093,750,000,000,000. To this must be added the number of eggs laid by the tenth generation before winter, for the renewal of their progeny the following season. M. Reaumur, however, on the observations of M. Bonnet, reckons 90 for the first generation from a single mother, and reckoning that each of these produces 90 more, the second generation will be 8100; the third will be 729,000; the fourth will be 65,610,000; and the fifth will be 5,904,900,000. The ninth generation in this case would be 350,970,489,000,000,000. That this calculation is founded on the best ascertained facts, appears from the experiments of M. Bonnet to which we have above referred, and he has been so particular as to record the day and hour of the birth of each individual insect. In one of his journals we find 95 plant-lice produced from one mother between the 1st and the 21st of June; in another, 90 plant-lice from the 30th May to the 15th June. M. Latreille, a high authority, states the increase at 25 young a-day from the same mother, though, on looking over M. Bonnet's tables, we find the numbers never exceed ten, and are usually from four to six young a-day; so that, supposing the facts relate to the same species, there must be some mistake in M. Latreille's statement.

Even, however, at the lowest estimate, the rate of increase is almost inconceivable, and hence we need not wonder that these insects sometimes appear in such numbers as to obscure the air. "On the 1st of August," says White of Selborne, "about half-an-hour after three in the afternoon, the people of Selborne were surprised by a shower of *Aphides* which fell in these parts. They who were walking the streets at that time found themselves covered with these insects, which settled also on the trees and gardens, and blackened all the vegetables where they alighted. These armies, no doubt, were then in a state of emigration, and shifting their quarters, and might perhaps come from the great hop plantations of Kent and Sussex, the wind being that day at north. They were observed at the same time at Farnham, and all along the vale at Alton." "I remember seeing," says Major, "in this neighbourhood (Leeds), in the month of September, I believe in the year 1829, the species which infests the apple-tree alight in clouds, so as almôst to cover every kind of tree or plant they came in contact with."

*Growth and Changes.*—The growth of insects is somewhat different from that of larger animals, insomuch as the skin of insects never expands; for when the animal within increases in bulk, the skin is burst through and thrown off. In the plant-lice, as in other insects, when first brought into life by being hatched either within or without the body of the mother, the outer skin encloses a succession of several other skins, each becoming more delicate, soft, and indistinct than the one exterior to it, but gradually, like the expanding leaves, growing more substantial and firm as it receives a supply of nutriment. The superfluous nourishment, usually in considerable quantity, and called the *fat* of the insect, appears to lie between the successive skins. But as the first inner skin expands and increases in consistence, the fat which lies between it and the outer skin seems to be absorbed into the body of the insect, and of course swelling it out; while its abstraction from the interior of the outer skin renders this much more dry, separates it from the inner skin, and disposes it to harden and shrivel, while all the internal organs become enlarged by the nutritive fat. The expansion, therefore, of the body of the insect, on the one hand, and the shrinking of the old skin on the other, produce a mutual struggle, which, from the continued operation of the causes, must, it is obvious, be soon brought to a termination. The skin, from losing its internal moisture, loses also a portion of its colour, and becomes obscure and dull; and the insect, from being girt and squeezed by its pressure, begins to turn and twist itself in various directions, to rid itself, if possible, of the inconvenience. By continuing these movements, the creature succeeds at length in rending the old skin at its weakest part, which is usually on the back, just behind the head; and in a few minutes, using its body as a wedge, it may be seen issuing through the breach. The old skin is thus abandoned like a worn shirt, and the insect appears in an entire new dress, the tints of which are at first paler, but become fresher and brighter. The insect, also, in consequence of the quantity of fat which has gone to augment its several parts, becomes all at once so much enlarged in size, that we can with difficulty conceive how it could have been contained in the old skin out of which it has just crept. The cast skin is frequently so very perfect that it might almost be supposed to be the insect itself.

M. Frisch ascertained that most species of plant-lice cast their skins four times before they arrive at full growth. M. Bonnet observed species which moulted only three times. If a plant or tree, accordingly, infested with plant-lice be examined, the leaves will be seen strewed with the cast skins of the insects, of a white colour; and we mention this the more particularly, that some inaccurate observers, overlooking their form, have represented these cast skins as the eggs of the insects. Since the eggs of the plant-louse are hatched within the body of the mother during summer, and the young before birth grow to a considerable size, it is probable that the skin is then capable of expanding like that of larger animals, without being cast. M. Dutrochet, indeed, proved by dissection that the egg-organ ( [illegible] f the wild chiccory plant-louse (*Aphis Cichorii*) has fo [illegible] g chains of what appear to be young becoming larger and [illegible] as they lie nearer to the egg-tube (*oviductus*), and are ready to be excluded. Into this tube he found also a small duct coming from a sort of bladder containing a glutinous liquid; and though he could not determine the use of the liquid, we think it not improbable that it may be (as is certainly the case in other insects) for the purpose of enveloping the eggs laid before winter with a coating to protect them from cold and external injury. Some of these eggs, indeed, such as those of the oak plant-louse and of the American blight (*Aphis lanigera* or *Eriosoma Mali*), appear as if varnished over with brownish glue.

*Longevity and Winter Quarters.*—M. Bonnet found that the mother plant-lice which he kept in confinement, after producing so many as ninety or more young, became much flatter and smaller, and soon after died, as all insects probably do, when they have laid their due number of eggs.

It is the generally received opinion among naturalists, that plant-lice pass the winter only or chiefly in the egg state, the eggs, or, perhaps more correctly, the cocoons, being hatched the succeeding spring. There can be no doubt, however, that this, if it be the general fact, has exceptions; for many of the perfect plant-lice pass the winter in sheltered places, in a similar manner to the female wasps and humble bees, which pair in the autumn, and while the males all die, they remain ready to bring forth a numerous progeny in spring. That such fertile females are not always to be found in winter, and in the case of the hop-fly, and many others, could not procure their natural food from the plants having withered down, is no more proof of their not doing so, than is the known fact that wasps do not in winter, as in the autumn, fly about our apartments in search of food. For, even on the supposition that they must have some food, though cold diminishes the appetites of all insects, there are other plants besides those most natural to them, on which they may contrive to subsist. Nothing is more common than to see foreign plants in pots, both in rooms and greenhouses, infested with our native plant-lice in the winter time, and even in summer. I have observed the bean dolphin (*A. Fabæ*), spread over a bed of spinage, and among myles or goosefoot (*Chenopodium*) though plenty of fresh bean plants were at hand. Were the distinctive character of the species better known, I have not a doubt that several of them might be observed to feed on more sorts of plants than one or two. The cabbage plant-louse (*Aphis Brassicæ*), for example, thrives well on the common mustard, as well as on the turnip, and, if I mistake not, on the radish; and the root plant-louse of the lettuce, is no less fond of the roots of endive. I think I have also traced the rose plant-louse (*A. Rosæ*) to plants so different as the geraniums (*Pelargonia*), the purple convolvulus (*Lavatera*), and the chrysanthemums. If these views are correct, as I have little doubt they are, there will be no difficulty in accounting for the various species finding food throughout the winter, even when no eggs have been laid in the autumn. Baron de Geer found that the plant-louse which produces the singular looking galls on fir-shoots (*A. Pini*) passes the winter, even in Sweden, where the cold is much more severe than in England, attached to the branches of the fir. (*Mém. des Insects*, III.)

M. Reaumur says, " Towards the end of December and the beginning of January, I have seen several plant-lice on the buds of young shoots on a peach-tree, after some days of severe frost. These were wingless females, very plump, and full of young." Similar facts are far from being uncommon, and may be easily verified by any observer who will take the trouble. M. Reaumur states also, that a severe winter is so destructive to them, that it greatly diminishes their numbers the following summer, a remark, however, at variance with what is observed in most other insects, whose numbers are certainly not diminished by the greatest severity of the winter. After the severe winter of 1822–3, for example, plant-lice were very abundant.

*Mouth-Suckers, and Mode of Feeding.*—The popular notions, often adopted in books by compilers, respecting the mode of feeding in the plant-lice is not only erroneous but impossible in fact. The presence of the hop-fly (*A. Humuli*), says one of these authors, " will entirely depend (else we are much deceived in our observation) on some morbid change in the plant itself; and these are linked together as cause and effect. Now this morbid change will be connected with corresponding mutations in the atmosphere, some blight, imported on the wings of the winds by which the ambient air is parched, while a crippled and diseased vegetation transpires from its leafage the saccharine exudation called honey-dew;" and as the eagles (*vultures*) "will collect where the carcass is, so aphides congregate where the leaves are imbued with this morbid nectar." But so far from this being the fact, the hop-fly neither does nor can feed on the honey-dew; and if it did, it would prove rather beneficial than otherwise, by clearing it from the leaves, whose respiratory functions it obstructs in the same way as treacle introduced into the lungs will obstruct the breathing of animals. The unquestionable facts are, that the hop-fly (*Aphis Humuli*), so far from feeding on diseased plants, only selects the youngest and most healthy leaves and shoots, into the tender and most juicy parts of which it thrusts its beak (*haustellum*), which is longer than its body, and no more fitted for lapping honey-dew than the bill of Æsop's crane was for eating out of a shallow plate.

The mere inspection of one of these insects with a pocket magnifier, will be sufficient to demonstrate this position; but, for the sake of illustration, I shall give a few details, and for that purpose I shall select the brown plant-louse of the oak (*A. Quercus*, Linnæus), in which, from its being much larger than its congeners, the parts are more conspicuous. The sucker in this insect is much longer than the body, and, when unemployed, is carried between the legs, close to the belly, extending behind the insect like a tail slightly curved upwards. The instrument consists of a transparent tube, terminating in a hole so minute, that Réaumur could not discover it with his most powerful microscopes, but easily proved its existence, by pressing out from it a drop of fluid. By means of pressure also, he could render more obvious two instruments of a brownish colour contained in the sucker, and which he conjectured to act like the piston of a pump; though, from their minuteness, this could not be correctly ascertained. We might suppose them to act as perforators, were it not that the point of the sucker itself seems sufficiently adapted to that purpose.

In order to add more power to the suckers, the insects may be observed to elevate the hinder part of their body, while they press down their head to force the sucker deeper into the bark of the plant. It appears to me also, though I cannot vouch for the fact, that after a plant-louse has pierced a hole with its sucker in any plant, it continues there without locomotion night and day, so long as it can find in this hole a sufficient supply of food; never leaving its station, even when bringing forth young, which in a short time take their station near the mother, and pierce holes for themselves. On casting their skins, they are obliged to withdraw their suckers from the holes, as the suckers cast the skin as well as the other parts of the body. On this occasion M. Bonnet observed, that the suckers sometimes stuck in the bark, and were only withdrawn after a considerable struggle.

It will appear from these details not a little singular, that a naturalist so favourably known for his beautiful drawings as Mr Swainson, should have inadvertently advanced the extraordinary opinion that the " masticating organs" of sucking insects being " totally useless," and such insects " being supported by suction alone, it is obvious that in this state they can do no injury to the agriculturists." It would certainly be good news to the growers of beans, hops, and cabbages, if this strange assertion accorded with fact.

*Destructive Effects and Ravages.*—With so efficient an instrument as the sucker (*haustellum*) which I have described, I need not wonder that a race so countlessly numerous as the plant-lice, should effect most destructive ravages on the plants which they infest. The parts they usually attack are the youngest shoots and the youngest leaves, as being most abundant in the juices on which they feed, and at the same time being most easily pierced. It is therefore a very mistaken, though a popular notion, that they only attack plants or leaves already diseased. This notion has originated, like many other errors, from mistaking the effect for the cause; because the insects are seldom observed on account of their minuteness, till they have disordered or deformed the parts attacked, by sucking out the juices designed for healthy nourishment and growth.

We are told by vegetable physiologists, that the sap, after its ascent, is spread out on the upper surface of the leaves, to be exposed to the light and air, where it is converted into pulp, analogous to the blood of animals, and returned by the under surface of the leaf. Now it is usually on the under side of the leaves that the plant-lice establish themselves, to catch up the pulp as soon as it is prepared, or on the young shoots, where they take it up as it descends. The whole plant is thus robbed of its nourishment, and the leaves shrivel up, as is seen on the cabbage, and on the plum and the currant tree; or the blossoms drop, and the fruit does not set, as is seen in the bean and the hop.

*Excrementitious and other Discharges.*—It is now ascertained that plants which feed solely on liquid food discharge into the air, and also into the soil where they grow, excrementitious gases and liquids, being the portions of food which they could not appropriate as nourishment. The plant-lice, which also live, as we have seen, wholly on liquid food, discharge no solid excrements. As the plant-lice differ in so many particulars from other animals, so do they in these discharges, which both take place in the usual way by the vent (*anus*), and also by what may be appropriately termed the rump-tubes (*tubuli uropygii*), one on each side of the rump, long and horn-like in some species, in others with no projection but a mere opening.

Through these is discharged a clear, colourless fluid, clammy and sweet like honey, and on evaporation leaving upon paper a gummy mark, not unlike that left by solution of gum-arabic. This is what is popularly termed *honey-dew*, respecting which so many unfounded and very absurd opinions have been and still are promulgated. Pliny hesitates whether to term it the sweat of the heavens, the saliva of the stars, or a liquid produced by the purgation of the air.

“ I have seen,” says Dr Mason Good, “ as probably many who read this work have also, a hop-ground completely overrun and desolated by the hop-green-louse (*Aphis Humuli*) within twelve hours after a honey-dew (which is a peculiar haze or mist loaded with poisonous miasm) has slowly swept through the plantation, and stimulated the leaves of the hop to the morbid secretion of a saccharine and viscid juice, which, while it destroys the young shoots by exhaustion, renders them a favourite resort for this insect, and a cherishing nidus for myriads of little dots that are its eggs.”—(*Study of Medicine*, 3d edit. i. 339.) The whole of this is obviously erroneous and fanciful, for it has been already proved that the mouth of a plant-louse is quite unfitted to feed on honey-dew, and that the shoots are not morbid nor unhealthy till attacked by the insects; while the "little dots" described as "eggs" are nothing but the cast skins, the insects never laying eggs at the season in question.

Linnæus, on the contrary, who did not adopt this popular fancy of a miasmatous haze, ascribes the honey-dew, on the leaves of the hop at least, to a diseased state of the plant, caused by the caterpillars of the ghost-moth (*Hepialus Humuli*) attacking the roots,—a very far-fetched and unfounded explanation. Dr Withering, however, believing it correct, recommends covering the roots of the hop with stones as a preventive, inasmuch as the caterpillars, he avers, never attack wild hops, which grow in stony places. Mr Swainson terms honey-dew one of the diseases of vegetables!

Another ill-informed writer says, the "honey-dew *mostly occurs after* the crops have been attacked by the plant-lice." Sir J. E. Smith, though he admits the correct explanation given above as the *common* cause of honey-dew, contends that what is found on the leaves of the beech is an exception; but he adduces no evidence at all satisfactory in proof of its being caused by unfavourable winds; while the undoubted fact of its being the excrement of plant-lice in so many other instances weighs directly against him.

A novel theory of honey-dew has recently been published, which ascribes it to an electric change in the air. "Last summer," says the author, "we investigated the phenomenon with great care: the weather had been parched and sultry for some weeks previous, and the honey-dew prevailed to such an extent, that the leaves of the currant, raspberry, &c. in the gardens, literally distilled from their tips a clear, limpid honey-dew, excreted from the plant; for the phenomenon was observable on those plants that were entirely free from aphides, and so copious was it, where these insects were found, that, had their numbers been centuple, they could not certainly have been the source of the supply. The question with me, however, was set at rest by applying a lens, having previously washed and dried the leaf with a sponge, for in this case the immediately excreted globules became apparent." But in this, of wiping a leaf, might not the leaf have been previously wounded, perhaps, by the beak of some plant-louse, and hence the exudation of sap, [illegible]t honey-dew? and may not the circumstances of finding the honey-dew on leaves where there are no plant-lice be accounted for on the principle that the insects had abandoned, as they always do, the parts covered with their *ejecta*, unless these fell from insects on some overhanging branch? It is, indeed, justly remarked by M. Sauvages, that they are careful to eject the honey-dew to a distance from where they may be feeding. I have now (March) in my study a plant of the Chinese chrysanthemum (*Anthemis artemisiæfolia*, Willdenow), the young shoots of which have swarmed with plant-lice all the winter, and the leaves below are covered with honey-dew. I tried the experiment of wiping it off from a leaf, but no more was formed when it was protected by a piece of writing-paper from the plant-lice above; while the writing-paper became sprinkled all over with it in a few hours. By means of a lens, also, I have actually seen the plant-lice ejecting the honey.

The honey-dew ejected by the plant-lice is most obvious in the case of the mealy species (*Eriosoma*), and in those of the elm, the poplar, and the apple (American blight), as also sometimes in the cabbage plant-louse, it may be seen in round drops of a yellow colour, from the size of a pin's head to that of a currant, or even of a grape. When of small size, these drops have by some been mistaken for eggs. Ants, as well as wasps (though not bees), are extremely fond of the honey-dew, and hence ants have been accused sometimes of the injuries done by the plant-lice, a fancy as unfounded as M. Huber's, who represents the ants as keeping flocks of plant-lice in winter, as we keep milch-cows, and as having a language to command them to eject it when required;—all a misrepresentation of common facts, ingenious, without doubt, as all M. Huber's observations are, but in this case quite fanciful.

Honey-dew is sometimes ejected in considerable quantity, and more than once I have mistaken it under trees for drops of rain; and Major witnessed an instance in which a causeway under some sycamores infested with plant-lice was sprinkled with honey-dew similar to a shower of rain.

*Spreading and Migrations.*—It seems to be the general rule of nature to diffuse the several species of animals over as great a space as possible, and thus to stock every corner of the earth with life and enjoyment. In the well-known migrations of the swallows and other birds, the chief incitement evidently arises from the scarcity or abundance of food; and in like manner, were the destructive swarms of locusts to remain stationary, they must necessarily starve. But though plant-lice are, next to locusts, perhaps the most extensively destructive insect, it is seldom that even their greatest ravages exhaust their appropriate food. As they chiefly, however, feed upon the young shoots and the young leaves, the advance of the season renders these too hard to be penetrated, or too juiceless to be worth penetrating, by the plant-lice, which are accordingly thus compelled either to shift their quarters to some other species of plant later in producing young shoots, or to deposite their eggs to be hatched when their peculiar food comes again into season.

I have already quoted the account which White of Selborne gives of what he terms a shower of plant-lice. Another naturalist says, "A similar emigration of these flies I once witnessed, to my great annoyance, when travelling later in the year in the Isle of Ely. The air was so full of them, that they were incessantly flying into my eyes, nostrils, &c., and my clothes were covered by them; and in 1814, in the autumn, the aphides were so abundant for a few days in the vicinity of Ipswich, as to be noted with surprise by the most incurious observer."

I confess I feel not a little disappointed that the species is not mentioned in these instances, as it might serve to fill up a blank in the history of some of those which are most destructive. In the case of the hop-fly, I have myself remarked, for several successive years, that soon after midsummer they all disappear, though the leaves have only a few days before been literally covered with them in millions. The same is the case with those called the dolphin, which infest the bean (*Aphis Fabæ*), and that which infests the elder, named the zebra (*A. Sambuci*). It is highly probable that all these perish soon after the deposition of the eggs for the succeeding spring; but it is by no means an easy thing to ascertain this. If they migrate to the sea-coast and are drowned, as we are partly entitled, from the statements just given, to infer, their fate is similar to that of the locusts.

To enable the plant-lice to migrate, I have to point out one of the most singular adaptations of Providence known in any animal. When these insects first appear in spring, they are females, and without wings; but as the season advances, and it becomes indispensable for some of them to shift their quarters to procure food, a number are produced with wings, these also being all females. But upon one of these winged females settling in new quarters at a distance from her place of birth, she does not bring forth winged young ones like herself, but chiefly wingless ones, among which, however, a few winged ones also appear, all being still females. In the autumn, when males are produced, the greater number are without wings, but, like the winged females already mentioned, some males are also produced with wings, to enable them to migrate. M. Bonnet proved that the winged ones, both male and female, pair with the wingless ones. Those young ones which are destined to become winged, do not shew their wings till the third or fourth moult, the wings remaining folded up in little bunches at the shoulders. "I saw one of them," says Leeuwenhoeck, "put off its skin and assume a new form; its wings, which before had been folded up very close, it expanded by degrees, shaking them slightly, and then they appeared as straight and regularly placed as if they had never been folded up; and the same I observed in others." (*Arcana Naturæ.*)

*Natural Enemies of Plant-Lice.*—Systematic writers and compilers have altogether overlooked the fact, that the immense swarms of plant-lice produced on almost every species of vegetable, appear to have been intended by Providence to supply food to the smaller soft-billed birds (*Sylviadæ*), particularly the yellow wrens, the gold-crest, the babillard, and many others. It is no uncommon thing for gardeners, who observe these little birds busy among their growing-crop in search of plant-lice, to accuse them of devouring the crop itself,—a circumstance quite impossible, in consequence of the structure of their bills. Even so excellent a naturalist as White of Selborne was mistaken in this. "The willow wrens (the smaller sort)," he says, "are horrid pests in a garden, destroying the peas, cherries, currants," &c. "This sentence," says the Hon. and Rev. W. Herbert, "has probably been the cause of the murder of numbers of these most innocent little birds, which are, in truth, peculiarly the gardener's friends. My garden men were in the habit of catching the hens on their nests in the strawberry beds, and killing them, under the impression that they made great ravage among the cherries; yet I can assert that they never taste the fruit, nor can those which are reared from the nest in confinement be induced to touch it. They peck the aphides, which are injurious to the fruit-trees, and, being very pugnacious little birds, I have sometimes seen them take post in a cherry-tree, and drive away every bird that attempted to enter it, though of greater size and strength. The birds which are mistaken for them are the young of the garden-warbler (*Sylvia hortensis*), with which Mr White was not acquainted.

" I could not persuade my gardener that the yellow wrens did not eat the cherries, till he had shot some garden-warblers in the act of eating them, and compared them with the wrens, when he became satisfied with the error. In order to ascertain, beyond doubt, whether the yellow wrens ever eat fruit, I left some which had been reared tame from the nest, and, of course, were more likely to feed upon any new thing than the wild birds, without victuals, till they were very hungry, and I then offered them little bits of ripe cherry. They seized them with avidity, but immediately threw them down again; and it was evident that they would rather have starved than ate the fruit. I had no doubt of the fact, but I wished to set the question completely at rest, for I have seen them pulling the leaves of the cherry-tree so near the fruit, that any person might be deceived, and think they were eating it; and the young of the garden-warblers look so like them, that I am not in the least surprised at their having got into bad repute with the gardeners." (*White's Selborne*, p. 63, *note*, 8vo edit. 1832.) It is very obvious, I may add, that these slender-billed birds could never do any damage to pease, even if they had, as they assuredly have not, a fancy to eat them; but they are fond of frequenting pea-crops, to devour the plant-lice which infest them.

Next to birds, the most destructive natural enemies of plant-lice are insects, some of which, as in the case of the birds, are accused of committing the depredations they actually prevent; and there we should earnestly impress it upon gardeners and farmers to be careful, before they set about destroying any prevalent insect, to ascertain that the one they at [illegible] he real depredator, as it may as frequently happen to [illegible] e of [illegible] which feeds upon the destroyers. The simple test is seeing an insect actually eat or suck, and then there can be no doubt. Some time ago, I remarked, in a periodical work, an account by a correspondent of the ravages committed on beans, turnips, and hops, by the "shrimp" grub of the common lady-bird (*Coccinella septem-punctata*), though these insects, in both their active stages of life, most certainly never touch vegetable substances, feeding entirely on the green flies or plant-lice (*Aphides*), which are the cause of the destruction of which the lady-birds have been thus unjustly accused. This gentleman, however, seems to have thought himself entitled to accuse the lady-birds, merely because he saw them resting on (*not sucking or eating*) the turnips and hops, on the same sort of evidence as we might accuse him of eating grass, like Nebuchadnezzar, if we found him in a meadow. An orchardist at Pontefract destroyed many lady-birds as injurious in 1823!

The grubs of most species of lady-birds are about the size of a house-fly without its wings, rather flat, broadest about the shoulders, and tapering off towards the tail; the general colour bluish, or brownish-black, with usually a few dull orange spots. They have six feet, and move rather slowly. In some seasons they multiply very much, as in 1807, when they covered the cliffs at Brighton, and of all the watering-places on the Kentish and Sussex coasts, in such numbers, as alarmed the ignorant and superstitious. In 1826, the lady-birds cleared off swarms of the gooseberry plant-louse. Several instances of a similar kind are on record. The lady-birds themselves, as well as their grubs, feed on the plant-lice. The grubs, also, of lace-winged-flies (*Hemerobidæ*), well known for their slow flight, their broad, pale greenish, gauze-like wings, their shining, amber-like eyes, and bad scent, are so great devourers of the plant-lice, that M. Reaumur calls them plant-lice lions. These grubs are longer bodied, and not so common as the lady-bird grubs.

The maggots of some of the larger species of garden-flies, called, from their colour, wasp-flies (*Syrphidæ*), and sometimes ignorantly mistaken for bees, are more common than the last. These maggots have no feet, are soft and slimy, are thickest at the tail, tapering towards the head, and are greenish or brownish white. So late as December (1834), owing to the mild weather, I found one of those maggots feeding on the cabbage plant-lice at Lee, in Kent. All these aphidivorous insects are slow in their movements, for, as the plant-lice never move from their feeding-places so long as they can obtain food, their enemies require neither agility nor stratagem in order to catch their prey, and the plant-lice themselves make no effort to escape. "So great is their stupidity," says Dr Virey of Paris, "that they see their comrades devoured by their side, without dreaming that a similar fate awaits themselves. If this is philosophy and contempt of life, it certainly could not be carried farther; for the old stoics themselves never manifested half the indifference and apathy of our plant-lice." (*Des Mœurs et des Instincts*, ii. 393.) Besides these insects which seem thus to be in some degree peculiarly aphidivorous, the plant-lice do not escape from the common pest of the insect world, the ichneumon flies, whose well-known custom it is to deposite their eggs in the bodies of other insects, and the grubs, when hatched, therefore feed upon the living vitals of the creature infested, till death is the inevitable consequence. The species of ichneumons which thus attack plant-lice, are necessarily small, and were first, I believe, described by Mr William Curtis, in the *Linnean Transactions*, and one species is figured by Harris in his *Exposition of English Insects*. The phenomena attending them are singular.

There may often be remarked, on the leaves of various plants frequented by plant-lice, small, smooth, roundish bodies, not unlike a seed of the pimpernel (*Anagallis arvensis*), somewhat flattened on the under side, by which they seem glued down. I had long remarked such bodies, and had always supposed them to be a species of scale insect (*Coccus*); but having, last autumn, found a considerable number of such bodies in the very centre of many living families of the cabbage plant-louse (*Aphis Brassicæ*), I came to the conclusion, that the bodies most probably belonged to this species. On squeezing one of the bodies, it was found that the outer covering or shell was rather hard, and the interior filled with a thick orange-yellow fluid, like that in the chrysalis of a butterfly, or the pupa of a moth, leaving no doubt that it was organized and endowed with life; that, in fact, it was a sort of pupa analogous to those of the wasp-flies (*Syrphidæ*) in the skin, having changed texture with out any moulting, as takes place in butterflies,—confirmed also by the remains of the legs of the insect being still attached.

I inclosed about a dozen of these in a chemical test tube, and in a few days I was surprised to find that a number of ichneumon flies had issued from them. I afterwards met with Mr Curtis's paper, in which he shews that the grub of the ichneumon changes into a pupa in the body of the plant-louse, the skin of the latter hardening over it after the creature dies.

The number of plant-lice thus destroyed by ichneumons, is probably not very considerable; but as it seems to occur more particularly late in autumn, and about the beginning of winter, when the plant-lice are less numerous, it must tend to diminish the plant-lice, which otherwise would breed in spring, and may be intended by Providence as a check on their numbers.

Ear-wigs all devour plant-lice, particularly the species which cause leaves to shrivel and roll up.

*Artificial Methods of Destroying Plant-Lice.*—Were it nothing more than supplying food for so many birds and insects, it would be a libel on Providence to say that plant-lice have been made in vain. They may also be conjectured to have been provided as a check upon the too great increase of particular plants; but this, though no doubt important in a natural state of things, by no means accords with the artificial views of gardeners and farmers, who desire such increase to be as great as possible.

In order to keep down the numbers of plant-lice, the first thing we should recommend is, to give all possible encouragement to the breeding of their natural enemies, the soft-billed birds, and the insects already mentioned; for we are sorry to say, that all other methods recommended are sadly deficient in being extensively effectual. Were it possible, as it seems not to be, to discover the winter deposites of the eggs or pupæ, or the winter retreats of the insects themselves, when these continue to live, something effectual might be done. But when it is recollected that snails and slugs, which are so much larger and more easily seen, continue to infest gardens, notwithstanding the precautions taken to extirpate them, we cannot hope much to be done against the small or minute plant-lice.

One of the [illegible]etho[illegible] for destroying plant-lice is by means of tobacco smok[illegible] ibly on the infected plants by means of a pair of bellows, a plan which answers well in the case of small plants, when they are previously covered, as recommended by Dr Darwin, with inverted funnels of brown paper, to confine the smoke. In the stove and the conservatory, again, the whole place may be shut close up, and half a pound, or some such quantity of tobacco, may be burnt on a brazier, without injury to the plants.

In the case of plants which cannot be conveniently smoked, tobacco, in finer powder than snuff, should be strewed on the leaves when they are moistened with dew or rain; or tobacco water may be squirted over them, by means of a syringe or a garden engine. This is made by pouring a pailful or so of boiling water over half a pound or more of tobacco in a close vessel. M. Bouché recommends sprinkling the leaves with powdered quicklime, as next in efficacy to tobacco; but I have found it ineffectual. It may not be amiss here to mention some of the methods which have been proposed, and which have either been unsuccessful in destroying the plant-lice, or have proved injurious to the plants. Potato water, from its known poisonous quality, was supposed to be destructive to plant-lice, but experience has not proved this. Smearing the joints of plants where eggs may be supposed to have been laid, is equally futile, for, as M. Bouché remarks, it is soon washed off by rain, or cracks, and falls off through dryness.

Early in the spring, Dr Darwin directed a nectarine tree to be moistened with tar-water, and parts of the wall to be smeared with tar; another to be moistened with lime and potash dissolved in water; a third with soap-suds, and lime added to them; and many, both nectarine and peach trees, with soap-suds alone. This was done by means of a brush, before any flowers appeared, and was repeated thrice on different days; but, to his great disappointment, when the leaves appeared, they became affected with the plant-lice as on former years. He also afterwards dipped many nut-leaves crowded with the plant-lice in a strong infusion of tobacco, for a few minutes, as the leaves hung on the trees, without, as he believed, destroying the insects, though some of them appeared for a time to be rendered torpid.

Dr Darwin also sprinkled some oil of turpentine by means of a brush, on some branches of a nectarine tree, which was covered with the plant louse; but it killed both the insect and the branches. A solution of arsenic, much diluted, did the same; but might not the scent of turpentine, or of tar, smeared on a fruit-wall, deter the flies from approaching the trees to deposite their eggs? or might not arsenic, mixed with honey, smeared on the wall to which the trees are nailed, be likely to attract the plant-lice as well as other kinds of flying insects? But none of these should be smeared on the branches, lest it injure or destroy the tree. M. de Thosse having observed that his trees were attacked by multitudes of small insects of different colours, which injured their young branches, he destroyed them all in the following manner:—He put into a bowl a few handfuls of earth, on which he poured a small quantity of oil of turpentine; he then beat the whole together with a small spatula, pouring on it water till it became of the consistence of soup; with this mixture he moistened the ends of the branches, and both the insects and their eggs were destroyed, and other insects kept aloof by the scent of the turpentine.

A more recent writer, Mr L. Knapp, has the following observations applicable to the species which infest the branches and bark of trees, such as the American blight:—"Many remedies," he says, "have been proposed for removing this evil, efficacious, perhaps, in some cases upon a small scale; but when the injury has existed some time, and extended its influence over the parts of a large tree, I apprehend it will take its course, and the tree die. Upon young plants, and in places where a brush can be applied, any substance that can be used in a liquid state, to harden into a coat, insoluble by rain, will assuredly confine the ravages of the creatures, and smother them. Hard rubbing with a dry brush crushes many, but there are crevices into which bristles cannot enter: thus some escape, and propagation continues. I have very successfully removed the American blight from young trees, and from recently attacked places in those more advanced, by an easy application. Melt about three ounces of rosin in an open pipkin; take it from the fire, and pour into it about three ounces of fresh oil; the ingredients perfectly unite, and when cold acquire the consistence of honey. A slight degree of heat will liquefy it, and in this state paint over every node or imperfect part in a tree, using a common painter's brush. The substance soon hardens, and forms a varnish, which prevents any escape, and stifles the individuals. After this first dressing, a second application to these parts will, I think, be found to effect a perfect cure."

Mr George Lindley, in his excellent *Guide*, advises, when trees are infested with the American blight, to divest them completely of their loose bark, and to pare off smooth with a sharp knife, or scrape clear all places where the insects have formed excrescences round the knots; and then to apply with a strong painter's brush till the bark become completely covered, the following wash:—Take one gallon of quick-lime, half a pound of flowers of sulphur, and a quarter of a pound of lamp-black; mix the whole together with as much boiling water as will form the ingredients into a thick paint. It should be applied about blood-warm. As an efficacious application, at a moderate cost, Mr Couch recommends dilute sulphuric acid, three quarters of an ounce of which being mixed with seven ounces and a half of water. It is best applied in showery weather, by means of rags, but should not be put upon the young shoots, as it would prove injurious. It is no less destructive to moss and lichens than to plant-lice. Major's preparation, however, appears to be the best. He dissolves one pound of soap in two gallons of water, and adds more water to make five or six gallons. This is warmed and brushed over the shoots in spring with a painter's brush, repeating the process as often as is required. Major adds, that sulphur is of no use, while turpentine and oil injure the buds, the leaves, and the young shoots, though they do not affect the old bark. Soap-suds will not by itself kill the insects, unless they are very strong; but, along with tobacco-water, they appear to be the best thing hitherto discovered.

Tobacco-water, which is so useful in destroying plant-lice, may be had at the cost of about sixpence or eightpence a gallon, at the tobacco-manufactories; and one pound of soap, in four gallons of water, mixed with three or four gallons of this tobacco-water, or thrice the quantity of tobacco-water made from English tobacco, and thrown blood-warm from a garden-engine, in the form of fine rain, is a good mode of application to all the plant-lice which frequent leaves and [illegible] shoots.

## SYSTEMATIC DESCRIPTION OF BRITISH PLANT-LICE.

The group of insects comprehending Plant-lice (*Aphides*, Leach), and arranged by Linnæus under the genus *Aphis*,[*] are separated by Dr Leach into two genera, *Aphis* and *Eriosoma*. The group is characterized by the feet (*tarsi*) being two-jointed, the first joint very short, the last joint vesiculous; the mouth in both the male and female in form of a sucker (*haustellum*); the ears (*antennæ*)[†], with six or seven joints.

### I. The Plant-Louse (*Aphis*, Leach.)

This genus is characterized by the insects having a soft oval body, small head, placed crosswise, entire and semiglobular eyes; the ears (*antennæ*) larger than the body, often bristle or thread-shaped, sometimes thickened towards the tip, of seven joints, the two at the base very short, the next very long and cylindrical; the mouth-sucker (*haustellum*) arising from the under part of the head between the fore-legs, nearly perpendicular to the body, and with three distinct joints; the wings, when evolved, four in number, the upper pair (*elytrella*) longer than the under pair, and somewhat triangular; the legs very long and slender, in consequence of which the walk appears awkward; the rump on each side above the vent (*anus*) with two immovable horn-like members, hollow, and serving to discharge the sweet liquid termed honey-dew.

1. *Plant-lice with the ears* (antennæ) *long, tapering like a bristle.*

1. Wormwood Plant-louse (*A. Absinthii*, Linnæus). General colour black; the back greyish, with a large brown spot; the tail-bristle (*stylum*) erect. Found on wormwood and mugwort. *Linn. Syst. Nat.* ii. 735.

2. Mallow Plant-louse (*A. Althææ*, Harris). General colour of the winged ones blackish-green, of the unwinged ones reddish-brown. Figured by Harris, *English Insects*, 66, pl. xviii. figs. 3 to 6.

3. Oat Plant-louse (*A. Avenæ*, Fabricius). General colour green, the horn-like members of the rump and the joints of the legs black; the head and first joint of the ears (*antennæ*) yellow; the eyes black; the tail with a bristle (*stylum*); the legs livid; the joints and feet (*tarsi*) black. Found on the ears of wheat, barley, oats, and particularly of rye, causing, by its punctures of the young grain, the excrescence termed ergot or spur, so much mistaken by many writers. *Fabric. Syst. Rhyngot.* 297.

---

[*] Greek, ’αφις, *a bug*, from ’αφυωμαι, *I suck a plant*, according to M. Dumeril.

[†] See *Alphabet of Insects*, 2d edit.

4. Cabbage Plant-louse (*A. Brassicæ,* Linnæus). One-twelfth of an inch long; general colour of the unwinged ones pale slate-grey, body covered with a white mealy down—the winged ones dark green; the head, eyes, and wing-ribs (*costæ*), black. Found on cabbage, turnips, broccoli, cauliflower, mustard, and similar plants, commencing its ravages about the end of May or the beginning of June, and continuing till checked by the frost, multiplying prodigiously, as in 1826 on cauliflower, in 1827 on turnips, and in 1833 on cabbages. Soap-suds are the best thing to destroy them. Figured by Frisch, pl. iii. fig. 15, and by Harris, *English Insects,* Tab. 18.

5. Thistle Plant-louse (*A. Cardui,* Linnæus). General colour black, with a bronze lustre; ears (*antennæ*) and base of the legs pale; edge of the abdomen with punctured plaits; tail furnished with a bristle (*stylum*). Found on the stems of *Carduus acanthoides,* and other thistles. *Linn. Syst. Nat.* 735.

6. Spindle-Tree Plant-louse (*A. Euonymi,* Fabricius). General colour black; the abdomen brown, with its edge elevated and punctured; the tail-bristle (*stylum*) as long as the rump-horns; the wings transparent, with a brown spot at the outer edge; the legs pale, with black joints. Found on the leaves of *Euonymus europæus,* and is the species anatomically examined by M. Dutrochet. *Fabric. Syst. Rhyngot.* 297.

7. Juniper Plant-louse (*A. Juniperi,* Fabricius). The body variegated; rump-horns short, thick, and abrupt. Found on the leaves of the common juniper. Figured by Baron De Geer, *Insect.* iii. 53; pl. iv. figs. 7 and 8.

8. Yarrow Plant-louse (*A. Millefolii,* Fabricius). General colour brown; abdomen greenish, having its sides slightly barred with white; the wings rather flat and darkish; ears (*antennæ*), legs, and rump-horns, black; eggs at first green, but changing to black. Found on the common yarrow and its congeners. Figured by Baron De Geer, *Insect.* iii. 60. pl. iv. figs. 1 to 5.

9. Poppy Plant-louse (*A. Papaveris,* Fabricius). General colour black; the head black; the ears (*antennæ*), the tail-bristle (*stylum*), and the rump-horns, pale; the legs black or pale, with deep black joints; the wings pale, with a brown rib. Found on the leaves of the poppy (*Papaver somniferum*), and is the species experimented on by M. Trembley. *Fabric. Syst. Rhyngot.* 299.

10. Pea Plant-louse (*A. Pisi,* Linnæus). General colour of the wingless one yellowish-brown—of the winged ones green; the wings transparent. Found on pease, and very destructive. The best remedy is topping the infected shoots and leaves. The insect itself is very liable to be attacked by a small ichneumon, which deposites an egg in its body. Figured by Harris, *English Insects,* Tab. 18.

11. Apple-leaf Plant-louse (*A. Pomi,* Latreille). General colour yellowish-green; the head black, the ears (*antennæ*), and legs, blackish-brown; the tail-bristle (*stylum*) and rump-horns black; the eggs, oval

and shining black, are laid in October, on the spurs of the branches, and are hatched when the leaves bud in spring, the young being dark green, with the head and legs black. Found on the young shoots and leaves of apple-trees, from the time of budding till the middle of June, after which these insects do not again infest them till September. The best thing to destroy them is soap-suds, mixed with tobacco-water. Frequently washing with pure water, as recommended by Harrison, is of little use, as plant-lice cannot easily be drowned. Lime and lime-water, sulphur, and such like, are equally useless. Figured by Baron De Geer, *Insect.* iii. 53. pl. iv. fig. 29 ; and by Dr Shaw, *Gen. Zool.* vi. pl. 58.

12. Plum-leaf Plant-louse (*A. Pruni*, Fabricius). General colour greenish ; the ears (*antennæ*) and the legs green ; the edge of the abdomen raised and plaited, having a darker line down the middle, and a dot on each side at the base; the tail pointed; the rump-horns thread-shaped. Found on the leaves and young shoots of plum, apricot, and nectarine trees, puckering them up, and do great injury, as was the case in 1834. They may be destroyed in the same manner as the preceding, except the blossoms be on the trees, when the best remedy is picking off the infected leaves. Figured by Baron De Geer, *Insect.* iii. 49. pl. ii. figs. 1. to 8; and by Reaumur, iii. pl. xxiii. figs. 9. and 10.

13. Oak-shoot Plant-louse (*A. Quercus*, Linnæus). General colour brownish-black ; the body comparatively large ; the ears (*antennæ*) and joints of the legs, rusty-brown ; the mouth-sucker (*haustellum*) very long. Found on the shoots of the common oak, and is one of the species experimented on by MM. Bonnet and Trembley. Figured by Reaumur, iii. pl. xxviii. figs. 5 to 14.

14. Currant Plant-louse (*A. Ribis*, Linnæus). General colour shining-green ; the eyes black ; the ears (*antennæ*) as long as the body; the legs brown ; the tail blunt ; it is not so egg-shaped, being more tapering at the head and tail than the gooseberry plant-louse. Found on the under side of the leaves of the currant, causing them to pucker up into yellowish or reddish blister-like protuberances. In spring one or two may be seen on a leaf for two or three weeks, after which they migrate to younger leaves, and multiply prodigiously. They leave the trees from the middle of June till the middle of July, depositing their eggs on the buds, and supposed themselves to winter in the earth. The best remedy is picking off the nfected leaves, it being nearly impracticable to reach the insects by any liquid. Figured by Reaumur, iii. pl. xxii. figs. 7 to 10; and by Frisch, *Insect.* ii. pl. xiv.

15. Rose Plant-louse (*A. Rosæ*, Linnæus). General colour green ; the ears (*antennæ*) very long, and tipt with black, as are also the rump-horns ; the tail pointed, but without a bristle (*stylum*). Found on the eaves and young shoots of rose-trees, and injuring the blooming. The best method of destruction is soap-suds mixed with tobacco-water, washed

over the parts infected. Tobacco-water alone I have not found effectual, even when the leaves and shoots were plunged in it. This is the species so minutely examined by Dr Richardson. Figured by Baron De Geer, *Insect.* iii. Tab. 3. fig. 10; by Harris, *English Insects*, 66, pl. xviii. figs. 1 to 3; and by Dr Shaw, *Gen. Zool.* vi. pl. 58.

16. Willow Plant-louse (*A. Salicis*, Linnæus). General colour black; the body large; the abdomen dotted with white, four larger dots on the back, those on the sides transverse and line-like; the rump-horns yellowish. Found on willows. Figured by Reaumur, *Insect.* iii. pl. xxii. fig. 2.

17. Sow-Thistle Plant-louse (*A. Sonchi*, Linnæus). General colour black; the body large; the tail furnished with a bristle (*stylum*). Found on the common sow-thistle. Figured by Reaumur, *Insect.* iii. pl. xxii. figs. 3 to 5.

18. Coltsfoot Plant-louse (*A. Tanaceti*, Linnæus). General colour black; the abdomen edged with rusty brown; the ears (*antennæ*) black; the corselet (*thorax*) with two paler black streaks; the tail furnished with a bristle (*stylum*). Found on the stems of the common coltsfoot. *Linn Syst. Nat.* ii. 733.

19. Guelder-Rose Plant-louse (*A. Viburni*, Scopoli). General colour black; the body opaque; the base of the ears (*antennæ*), and the shanks (*tarsi*) pale; the corselet (*thorax*) plaited; the tail furnished with a bristle (*stylum*). Found on the leaves and stems of the common guelder-rose. Scopoli, *Carniola*, No. 396.

20. Vetch Plant-louse (*A. Viciæ*, Linnæus). General colour green. Found on various species of vetch. Figured by Baron De Geer, *Insect.* iii. 58, pl. ii. figs. 14 and 15.

### 2. *Plant-lice with the ears* (antennæ) *not tapering, but rather thread-shaped.*

21. Maple Plant-louse (*A. Aceris*, Linnæus). General colour brown; the ears (*antennæ*) and shanks (*tarsi*) pale; the corselet (*thorax*) cylindrical, narrower than the abdomen, and thick at the sides; the abdomen keeled, with the sides plaited; the tail blunt. Found on the leaves of the common maple, and probably the species mentioned by Major as discharging honey-dew like a shower of rain. Figured by Reaumur, *Insect.* iii. pl. xxii. figs. 6 to 10.

22. Alder Plant-louse (*A. Alni*, Fabricius). General colour yellowish-white; the abdomen with tubercles; the eggs green, covered with a whitish powder. Found on the leaves of the common alder. Figured by Baron De Geer, *Insect.* iii. pl. vii. figs. 1 to 7.

23. Orache Plant-louse (*A. Atriplicis*, Fabricius). General colour glossy-black; the shanks (*tarsi*) pale; the corselet (*thorax*) nearly blunt; the abdomen plaited at the sides; the tail blunt. Found on the tops of *Atriplex hortensis.* Fabricius, *Systema Rhyngot.* 298.

24. Birch Plant-louse (*A. Betulæ*, Linnæus). General colour green and black; the head and the corselet (*thorax*) black; the abdomen green, tipt with brown; the legs black; the shanks (*tarsi*) pale; the rump-horns short and green; the wings with three black bands and greenish wing-ribs. Found on the leaves of the common birch. Figured by Reaumur, *Insect.* iii. pl. xxii. fig. 2.

25. Pine-leaf Plant-louse (*A. Pineti*, Fabricius). General colour black; the body dusted over with a sort of white powder; the hind legs long and fringed: the eggs black and shining. Found on the leaves of the Scots fir. Figured by Baron De Geer, *Insect.* iii. pl. vi. figs. 27 to 33.

26. Pine-branch Plant-louse (*A. Pini*, Linnæus). General colour greyish-brown mingled with red; the body one-sixth of an inch long; the rump-horns short and teat-like; the winged females and males brownish-black with ash-grey spots; the belly yellowish-brown; the eggs oblong and shining black, shrivelling when carried into a warm apartment. Found on the young shoots of the Scots fir, forming a sort of galls like a small fir cone. Figured by Baron De Geer, *Insect.* iii. 27. pl. vi. figs. 9 to 16.

27. Oak-leaf Plant-louse (*A. Roboris*, Linnæus). General colour black; the body large and somewhat globular; the ears (*antennæ*) livid and tipt with black; the thighs rust-red; very short horns on the middle of the abdomen. Found on the *Quercus Robor.* Linnæus, *Syst. Nat.* ii. 735.

28. Dock Plant-louse (*A. Rumicis*, Linnæus). General colour black; the body opaque; the ears (*antennæ*) and shanks (*tarsi*) pale; the edge of the abdomen raised and plaited; the tail furnished with a short bristle (*stylum*). Found on the narrow-leaved dock. Linnæus, *Syst. Nat.* ii. 734.

29. Lime-tree Plant-louse (*A. Tiliæ*, Linnæus). General colour greenish-yellow with black dots; the ears (*antennæ*) and legs variegated with white and black; the corselet (*thorax*) with a black lateral line on each side; the abdomen blunt with four lines of black dots; the eggs black and covered with a white down. Found on the leaves and shoots of the lime-tree. Figured by Baron De Geer, *Insect.* iii. pl. v. figs. 1 to 5; and by Dr Shaw, *Gen. Zool.* vi. 171.

30. Elm Plant-louse (*A. Ulmi*, Linnæus). General colour rusty-black; the body covered with longish white down; the ears (*antennæ*) very large; the wings very long and transparent, with a small brown spot at the outer edge; the rump-horns indistinct. Figured by Baron De Geer, *Insect.* iii. pl. v. figs. 7 to 18.

### 3. *Plant-lice not yet satisfactorily arranged.*

31. Sorrel Plant-louse (*A. Acetosæ*, Linnæus). General colour black; the body small with a green band. Found on the common sorrel. *Linn. Syst. Nat.* ii. 734.

32. Ash-weed Plant-louse (*A. Ægopodii*, Scopoli). General colour

black; the abdomen, legs, and mouth-sucker pale. Found on the leaves of the *Ægopodium podagraria.* Scopoli, *Carniola*, No. 399.

33. Sallow Plant-louse (*A. Capreæ,* Fabricius). General colour green, paler at the sides; the eyes, the ears (*antennæ*), and the tips of the legs, black; the abdomen pointed. Found on the sallow (*Salix caprea*). Fabricius, *Syst. Rhyngot.* 294.

34. Cherry Plant-louse (*A. Cerasi,* Fabricius). General colour glossy black; the body stout and plump, and egg-shaped; the middle of the ears (*antennæ*) and the shanks (*tarsi*) pale; the corselet (*thorax*) reddish-brown above, and quite red beneath; the fore feet pale, the other feet black with white spots. Found on the leaves of the cherry tree, and is very injurious, commencing its ravages about the end of April or beginning of May, multiplying rapidly. It leaves the trees in June, and is not seen on them again till September. It is supposed to winter under ground. The best remedy is syringing the trees with soap-suds mixed with tobacco-water. Fabricius, *Syst. Rhyngot.* 295.

35. Saw-wort Plant-louse (*A. Cirsii,* Linnæus). No description published. Found on *Serratula arvensis.* Linnæus, *Faun. Suec.* No. 987.

36. Blue-vetch Plant-louse (*A. Craccæ,* Scopoli). Found on the *Vicia Cracca.* Scopoli, *Carniola,* No. 407.

37. Carrot Plant-louse (*A. Dauci,* Fabricius). The ears (*antennæ*) black, pale at the base; the head and the corselet (*thorax*) brown; the abdomen green with a black blotch at the tail; the legs black. Found on the umbels of the carrot, and injurious to the formation and ripening of the seed. When the insect is observed, the plants should be treated copiously with soap-suds and tobacco-water. Fabricius, *Syst. Rhyngot.* 299.

38. Bean Plant-louse (*A. Fabæ,* Scopoli). General colour black. Found on the tops of all varieties of beans, as well as spinage and several other plants, and is very destructive to the crops. It is important, on first observing the insect, to go over the whole crop and cut off with a pair of scissars into a tin, wooden, or earthen-ware dish, all the infected tops, repeating the process till the whole are got under. No other mode of destruction can be of much use. Scopoli, *Carniola*, No. 408.

39. Gooseberry Plant-louse (*A. Grossulariæ*). General colour of the young brood light green, of the older ones dark green. Found on the twigs and leaves of the gooseberry, appearing in April, and very destructive, as in 1825, when hundreds of pecks of the fruit were not worth gathering; and again in 1826, till they were extensively devoured by lady-birds. Major says it is the common opinion in Yorkshire that they are caused by the smoke of Leeds. They may be partially destroyed by soap-suds and tobacco-water, but it is more effectual to pick the infected leaves.

40. Hop Plant-louse (*A. Humuli*). General colour green, and similar to the rose plant-louse, but rather smaller. Found on the youngest and

healthiest leaves and shoots of the hop, and not, as is usually asserted, on those previously diseased. Extensively destructive on hop grounds in particular years, as in 1793 and in 1798, when the entire crop failed. In 1794, a dry season, the insect was much less numerous; but very numerous broods of insects, like great crops of fruit, are rarely found in two successive seasons. No remedy has been discovered, though syringing with soap-suds and tobacco-water might prove partially useful. Topping, as is done with the bean plant-louse, would be the most certain; but it would injure the plants.

41. Knapweed Plant-louse (*A. Jaceæ*, Linnæus). General colour black; the wings white; the tail brown. Found on the *Centaurea Jacea.* Linnæus, *Faun. Suec.* No. 991.

42. Lettuce Plant-louse (*A. Lactucæ*, Linnæus). General colour green. Found on the leaves of the garden lettuce. Figured by Reaumur, *Insect.* iii. Tab. xxii. figs. 3 to 5.

43. Maudlinwort Plant-louse (*A. Leucanthemi*, Scopoli). General colour black; the abdomen greenish; the mouth-sucker greenish, tipt with brown. Found on the *Chrysanthemum Leucanthemum*. Scopoli, *Carniola* No. 404.

44. Lovage Plant-louse (*A. Ligustici*, Linnæus). General colour black; the base of the ears (*antennæ*) and shanks (*tarsi*) pale; the body comparatively large; the sides thickened and punctured; the ears as long as the body, the first joint the thickest. Found on the common lovage. Fabricius, *Syst. Rhyngot.* 301.

45. Lampwort Plant-louse (*A. Lychnidis*, Linnæus). General colour black; the abdomen plaited; the legs paler; the joints black. Found on the stems of *Lychnis dioica.* Linnæus, *Syst. Nat.* ii. 294.

46. Water-lily Plant-louse (*A. Nymphææ*, Linnæus). General colour green; the head and the corselet brown, covered with white down; the legs and the ears (*antennæ*) pitch-black. Found on aquatic plants. Linnæus, *Syst. Nat.* 734.

47. Bird-cherry Plant-louse (*A. Padi*, Linnæus). Found on the hagberry or bird-cherry tree. Figured by Reaumur, *Insect.* iii. pl. xxii. figs. 9 and 10.

48. Parsnip Plant-louse (*A. Pastinacæ*, Linnæus). Found on the garden parsnip. Linnæus, *Syst. Nat.* 734.

49. Plantain Plant-louse (*A. Plantaginis*). Found on the young stems of the plantain, and is one of the species examined by M. Bonnet.

50. Primrose Plant-louse (*A. Primulæ*). This species is found on the auricula, the polyanthus, and other species of *Primula*, and lays eggs which are at first green but afterwards become black.

51. Raspberry Plant-louse (*A. Rubi*). This is one of the largest species of the genus, and is sometimes not a little injurious, while it is impossible to destroy it, for it makes its attacks about the time the fruit is ripe.

52. Lettuce-root Plant-louse (*A. Radicis Lactucæ*). General colour greenish-white; the body comparatively large and plump. Found under ground about the crown of the roots of lettuce and endive, particularly in the autumn. A colony of ants usually establish themselves around the infested roots to feed on the honey-dew; and as they mine away the earth from the roots, the plants wither for want of nourishment, and the seeding is injured. The best remedy is pouring abundance of soap-suds around the roots, and treading in the earth firmly to the plants.

53. Currant-root Plant-louse (*A. Radicis Ribis*). A small species, of a buff or flesh colour, covered with a sort of cottony down. Found below the surface of the soil on the roots of currant trees, attacking them and causing the leaves to drop from the middle of July till the end of September, when many winged ones appear and migrate. It may be destroyed like the preceding.

54. Zebra Plant-louse (*A. Sambuci*, Linnæus). General colour black; the body comparatively large; each side marked with three white streaks; the base of the abdomen with a small dot on each side, and a single one near the tail. Found on the younger branches of the elder. Linnæus, *Syst. Nat.* ii. 734.

55. Scabiose Plant-louse (*A. Scabiosæ*, Scopoli). Found on devils-bit and other species of *Scabiosa*. Scopoli, *Carniola*, No. 405.

56. Vine Plant-louse (*A. Vitis*, Scopoli). General colour greenish; the back of the abdomen brown; a brown dot between the ears (*antennæ*). Found on the flower and fruit-stems of the vine, and very destructive by causing the bunches of grapes to shrivel and drop at an early stage. I have not myself seen the insect, and it is doubted by some whether it has been found in Britain.

## II. The Blight-Bug. (*Eriosoma*, Leach.)

This genus is characterized by the insects having the abdomen without rump-horns or tubercles, and the ears (*antennæ*) short and thread-shaped; the body usually covered with a light silky or cottony down. They "form," to use the words of Dr Leach, "what are called improperly galls on the stalks of trees, near their joints and knots, which are in fact excrescences, caused by the efforts of nature to repair the damage done to the trees by the perforation of these insects."

1. Purse Blight-bug (*E. Bursaria*, Linnæus). General colour dull brown, and somewhat translucent; the sides gibbous; the ears (*antennæ*) short. Found on the leaves of the black poplar, causing them to [illegible] the form of a purse. Figured by Reaumur, *Insect.* iii. tab. xxvi. figs. [illegible] to 11; by Swammerdam, *Bibl. Nat.* pl. xlv. figs. 22 to 25; and by [illegible] *Mus.* tab. xxxviii. fig. 8.

2. Hawthorn Blight-bug (*E. Cratægi*). Comparatively small. [illegible]

on the shoots and young leaves of the hawthorn, and excreting abundance of honey-dew.

3. Beech Blight-bug (*E. Fagi*, Linnæus). Found on the leaves of the beech. Figured by Reaumur, *Insect.* iii. pl. xxii. fig. 1.

4. Ash Blight-bug (*E. Fraxini*, Fabricius). General colour green and black; the abdomen green, with its edges black; the head and the corselet (*thorax*) black; the ears (*antennæ*) and the legs variegated. Found on the branches of the ash. Fabricius, *Syst. Rhyngot.* 297.

5. Apple Blight-bug or American Blight (*E. Mali*, Leach; *Aphis lanigera*, Illiger). General colour pitch-brown, but this can only be seen when the white silky down is removed; comparatively of middle size. Found on the chinks and cracks of the trunks of apple trees in early spring, and on the younger branches in summer, doing extensive injury to whole orchards. The greater portion leave the trees after mid-summer, or rather shift from one tree to another, as I have remarked that a tree much infested one year is nearly free the succeeding one, while those near it are infested. It has been said by Salisbury and others, that this insect winters under the surface of the ground on the roots of the trees where it has lived through the summer; but I have never been able to verify this, though I have often examined the roots of infected apple trees. On the contrary, I have found them high up on the trees, sometimes in chinks of the bark, and sometimes quite exposed. The eggs, or rather cocoons, I have also found once in a cluster under a bit of loose bark, where also a number of the parent insects were assembled. It is reported and believed that this very destructive insect has been at no distant period introduced from America; but the evidence for this, to say the most of it, is very vague, unsatisfactory, and by no means sufficient to convince a naturalist. It is of more practical importance to know how to destroy the pest, and for this soap-suds mixed with tobacco-water seem to be the best remedy. Figured by Sir Joseph Banks, *Hort. Trans.* ii. 162. pl. 11; and by W. Salisbury, in his *Hints on Orchards.*

6. Plum-tree Blight-bug (*E. Pruni*). This is often confounded with the preceding, but is a very distinct species, infesting the younger branches of plum, apricot, nectarine, and peach trees. It is not supposed to be oviparous, but some of the October brood survive the winter, lying in a half torpid state in chinks and cracks of the bark, multiplying prodigiously in the spring, and often rendering the fruit not worth gathering. In 1832 they were very abundant in Kent, though, as is not uncommon, not one was to be seen on the infected trees the two following years. The same remedy may be tried as for the preceding, taking care not to cause the fruit to crack.

7. Spruce Blight-bug (*E. Piciæ*, Panzer). On the branches of the spruce fir. Figured by Panzer, *Faun. Insect.* lxxviii. fig. 22.

8. Fir Blight-bug (*E. Pineti*, De Geer). General colour black, when the white mealy down is removed; the hind legs long and fringed.

Found on the Scots fir. Figured by Baron de Geer, *Insect.* iii. tab. vi. figs. 19 to 26.

9. Aspen Blight-bug (*E. Populi,* Linnæus). The head and the corselet (*thorax*) black; the abdomen greenish; the wings white, with the outer margin black. Found on the rolled leaves of the aspen.

10. Elm Blight-bug (*E. Ulmi,* Linnæus). The general colour rusty-brown. Found on the rolled leaves of the elm. Figured by Baron de Geer, *Insect.* iii. tab. v. figs. 7 to 8.

11. Nettle Blight-bug (*E. Urticæ,* Linnæus). General colour black; the abdomen brassy; the tail with an abrupt bristle (*stylum*); the wings white, with parallel black veins; the wing-rib brown; the legs black. Found on the stems and leaves of the common nettle. Figured by Frisch, viii. 34. pl. xvii.

12. Honeysuckle Blight-bug (*E. Xylostei,* De Geer). Found on the honeysuckle (*Lonicera Xylosteum*). Figured by Baron De Gee, *Insect.* iii. 96. pl. vii. fig. 8.

## ON ROT IN SHEEP.

(*To the Editor of the Quarterly Journal of Agriculture.*)

THE attention of your readers having again been called to the internal rot of sheep, I would humbly offer the following remarks to their consideration, hoping they may be of some use in leading either to a prevention or cure of that distressing disease which has been the means of ruining so many of our poor farmers, and perhaps of injuring the health of many of our people, who have been fed with unwholesome mutton. I first, then, would recommend your readers to read a small book published in 1823, at Berwick-upon-Tweed, by a Lammermuir farmer,[*] not that I agree with him as to the cause of the disease, but he gives many interesting facts and useful hints. He supposes that the rot is occasioned by feeding in a luxuriant after-growth of grass, but I have yet to learn that a luxuriant after-growth of clover occasions this disease. The fact I believe to be, that it is some particular plant which affects the animal. It is surely no longer believed that it is wet or cold; for if a ewe, when giving milk, does not suffer, is she more likely to escape the effects of cold than another sheep? But I believe it is admitted by medical men, that women giving milk are not so apt to suffer from poison as other persons; so also with sheep. I am inclined to believe that the butter-cup (*Ranunculus*), is the plant which is the cause of the mischief. Green in his Universal Herbal says, that all the parts of this plant are exceedingly acrid. In the Isle of Sky, it is used instead of Spanish flies to raise a blister. Curtis states that when cattle are tempted or forced to eat it, their mouths become sore and blistered; and, according to Linnæus, sheep and goats eat this plant, but cattle, horses, and even pigs, refuse it. Geese also eat it. Now, sheep and geese are more apt to have enlarged or diseased livers, than any of the other graminivorous animals that I am acquainted with.

---

[*] This is an excellent practical treatise on the management of sheep in upland pastures. Its author, the late Mr John Fairbairn of Hallyburton, we had the pleasure of knowing well; and many will bear us out when we state that no Lammermuir farmer could show a better flock of Cheviot sheep than he had. We may mention, as our correspondent only alludes to the former paper on rot arising from water meadows that this paper came to hand [illegible] late for insertion in our last Number.—EDITOR.

But to return to the Lammermuir farmer. He recommends salt as a decided cure for this disease. The dose is 1½ ounce of common salt, given in ¾ths of an English pint of water, to a sheep, with an empty stomach, for three or four mornings. Limewater is also good. I have seen both given: and, on killing the sheep that had two doses of the salt, there were about 160 flukes taken out of its liver, most of which were dead. But as a preventive is better than a cure, I would call your attention next to White, that close observer of nature. He says in his Natural History of Selborne, that "worms seem to be the great promoters of vegetation, which would proceed tamely without them, by boring, perforating, and loosening the soil, and rendering it pervious to rain and the fibres of plants, by drawing straws and the stalks of leaves into it; and, most of all, by throwing up such infinite numbers of lumps of earth." Again he says, "that the earth without worms would soon become cold, hard-bound, and void of fermentation." But more applicable still to the case of your correspondent, in p. 232, where he says, "Lands that are subject to frequent inundations are always *poor*, and probably the occasion may be, because *the worms are destroyed*." Now, I observe from your correspondent's remarks, p. 503 of vol. v. of your Journal, that his meadow, although well laid down in grass, soon appeared *starved*, after having been irrigated: so it is well worth his examining whether or not the *worms have been destroyed* by frequent irrigation? If so, I have no doubt he has got rid of the moles also, as the latter feed chiefly on the former. The Ettrick Shepherd says, vol. ii. p. 700 of your Journal, that it is his opinion, as well as that of shepherds, that the extirpating of moles, or doing away with mole-hills, was the primary cause of the disease amongst sheep, known by the name of pining. Now, the conclusion to which I have come in my own mind is, that earth is necessary for the general health of sheep, be it in the shape of mole-hills or worm-casts. True it is, that there are no moles in the sister island Old Ireland, and the sheep there are in general, I believe, sound, but there must be plenty of worm-casts. Your correspondent strengthens me in this opinion, that earth is good for sheep, when he states that folding them occasionally in fallow, is sometimes a means of preventing the rot. *

I watered a field of old grass in summer 1833, which I stocked chiefly with sheep, and I found they soon became all tainted, although those of a neighbour from the same breeder were perfectly sound. The shepherd, who had known my field for many years, said he was not aware that sheep had ever suffered in the field before from the rot; and I now think it very probable that I erred in not stocking the field sufficiently, thus by the length of the grass preventing the sheep from getting at the worm-casts or other earth. It occurs to me, that one reason why the disease of the rot is more common in England than in Scotland is, that they do not feed their grass so close as we do. Besides, they do not clean their fallows so well, and have more butter-cup, having older and richer pasture. The meadows in he neighbourhood of your correspondent are entirely new, so perhaps the worms are not yet destroyed, which may account for no rot being in these pastures; and those that are watered by ther streams may perhaps be supplied with mud or earth from such streams.

It is a custom at the Duke of Montrose's, and with others who feed pigs, to give them occasionally ashes or cinders; and as a pig is very apt to overeat itself, and to take all sorts of mixtures, it ought always (when prevented by confinement from getting at the earth of the field) to be provided with some alkali, to correct the acidity in its stomach. I had some time ago a large fat hog, which was confined, and kept very clean, getting nothing to eat but meal of various kinds, with milk; and just about the time I intended to kill it, I was prevented by its becoming very costive and unwell. I did not know how to administer any opening medicine to so strong an animal, but in turning it out of the sty, I found it begin to eat earth and lime; I therefore immediately mixed some magnesia with milk, and it soon took a sufficient quantity of it. I would also mention, that when the root of the bitter cassava is given, in the West Indies, *washed* to pigs, it kills them, but when they make their way into the provision grounds, and take plenty of earth with this root, it has apparently no bad effects on them.

---

* Buckbean (Menyanthes), Class 5, Ord. 1, is said to be a cure for the rot in sheep.

It ought to be generally known whether potatoes, when given raw to pigs or cattle, should be washed. I know not what is the best corrective for the poison of the solanum family, but an alkali is given to counteract the bad effects of meadow saffron and prussic acid. At all events, some earth may be the means of preventing swelling in cattle, when feeding either on turnips or potatoes *. I remember a butcher in the West Indies telling me, that he found cattle which were fed in pastures, through which a pure running river passed, had their livers always diseased, whilst those cattle which had water to drink out of filthy stagnant ponds, in which they stood for many hours in the day, had their livers quite sound. He and I both thought at the time, that it was the difference of temperature in the water, but I am now inclined to think that the earth was the means of keeping the liver sound.

I hope these few remarks may be of some use to your correspondent, or may be the means of drawing out some information from others. Whether the rot is occasioned by some particular plant, or by a luxuriant after-growth occasioning a fermentation in the stomach of the animal, my firm conviction is, that salt or earth, or both, are of use to graminivorous animals, as grass is occasionally to dogs and cats. Every observer must have seen horses eagerly chewing the roots of grass with earth, and grooms are aware that it is a bad sign of the state of the horse's stomach. Chalk is given to calves, and lime or shell gravel to fowls.

---

* A *large* quantity of earth, particularly in wet weather, eaten with turnips or potatoes, will cause cattle to scour, a *small* quantity will not; but scouring prevents swelling from either root. —EDITOR.

I would now ask, what takes place if a sheep eats some earth? does it not absorb the acid in its stomach and form a salt, thus in part agreeing with the recipe of the Lammermuir farmer? He mentions a striking fact (in his book before referred to), that the shepherds in Spain, while feeding their flocks on land with limestone, do not give salt to their sheep, but have occasion to do so when feeding them on any other soils; which I would account for by the lime correcting the acidity and forming salt. I may here mention the way in which salt is given to sheep in the West Indies; a large cask without ends is laid upon its side on the ground, a small hole being dug for the swell of the cask; four stobs or stakes are then driven into the ground, two on each side of the cask, to keep it steady; the salt is then put into it, and so protected from the rain. Those who give salt in this way, and feed their pasture close, so that the sheep can get at the worm casts, need not, I think, be much afraid either of the internal or foot-rot.

I have thus attempted to say a word in favour of the worm, as the kind-hearted Ettrick Shepherd stood forward in defence of the mole, rook and wood pigeon. I recollect destroying almost all the vermin in a large district of country in Perthshire, with a view of increasing the game; but the rabbits multiplied to such an extent as to become an immense nuisance. By the way, may not the increase of field-mice in a district in France, mentioned in the miscellaneous notices of your last Number but one, be accounted for in the same way. I would recommend to them a large importation of owls. If man sets his wisdom in opposition to the all-wise Lord of the Universe, and destroys in a small degree the balance of creation, every thing suffers from it. We are indeed wonderfully connected together; yes, the meanest and most grovelling animal is needful for the wellbeing of the whole.

S. W.

## REMARKS UPON THEORIES ON THE FAILURE OF POTATOES.

By Mr Towers, Author of the Domestic Gardener's Manual.

The failures in the potato crops of these last two or three years require some remarks, in consequence of the stress that is laid upon the subject in the Essays presented to the Highland Society, and published in the last number (xxix.) of their Transactions. In the general summary, page 45, there are some very pointed and interesting observations; one of which, at page 47, possesses peculiar interest: it is as follows:—"The potato," says Mr Anderson, "lying in the ground during the winter, becomes perfectly matured, retains its juices, is preserved from fermentation, and germinates at the natural season; and we have found that the plant proceeding from it is luxuriant and healthy."

Of this fact there can be no manner of reasonable doubt; every grower must have observed that he cannot clear his ground from tubers, some always remain, and these germinate at different periods of the spring, according to the climate and temperature of the place. We are but too apt to pass over facts and phenomena in matters of ordinary occurrence; but whoever will be at the trouble to investigate those sprouting tubers that have been left in the ground during a winter, perhaps two, will be taught a lesson of the mode in which the potato germinates. Such stray tubers may indeed be wounded by the fork, or cut by the spade at the time of the general autumnal digging; but they usually are found to be entire. I have recently had occasion to take up a very considerable number, and, with scarcely any exception, have perceived that the protruded shoots emerged almost exclusively from the crown or rose-end, where there are about four or five buds or eyes collected in a small compass. This end, the one opposite to the root, or that point by which the tuber was connected with the parent plant, is, in common with vegetable bodies in general, the soonest excited, and the shoots protruded from it are the earliest shoots. Owing to this circumstance it is that when frosts, during the early spring, destroy the first shoots, the plant recovers and produces others.

It is not that the same eyes push again; but, as in the case of trees, the excision of a leader by the pruning knife, causes lower buds to break, so the loss of the primary shoots of the tuber (which in fact is not *a root*, but, as now admitted, a species of underground stem), leads to the production of new shoots from the *lateral eyes*. This remark leads us to consider the advantage or disadvantage of planting entire potatoes. The learned Secretary to the Horticultural Society of London has recently undertaken a series of minute experiments; and the results are published in their Transactions. By these reports, it appears that sets produce a comparatively greater yield of potatoes. Of this simple fact no one can doubt who has witnessed the culture of potatoes under a variety of modes of planting, and for the obvious reason that, if the leading primary shoots from an entire tuber advance uninjured, the lateral eyes rarely push at all; but then, though it must be admitted that one whole potato will not produce a yield equivalent to that which the eyes of the same tuber would produce, if each were cut out and planted separately, yet the yield is greater and better by far than it would be from any single eye, the safety of the crop is more efficiently secured, and the chance of failure, even in one solitary instance, almost completely obviated. If seed be scarce, potatoes must be cut into sets, but if it be abundant, the small extra cost by the purchase of whole tubers, is more than covered by the excellence of the yield, and the security of the crop. Before I proceed to state my idea of one certain cause of the failure of a plantation, I must remark, that on every ground of philosophy, *tubers cannot be too ripe:* nature, by the evidence of the certain germination of stray tubers, as wisely noticed by Mr Anderson, confirms this theory. Again, if cut sets (with two eyes at the least) be planted, it is extremely doubtful whether any advantage has ever been derived from suffering them to become hard and dry. Some persons, to obviate the loss of time, have recommended the application of powdered air-slaked lime to the recently cut surfaces; but I think there may be danger in this process, and would advise the use of gypsum or plaster of Paris as a substitute. This is a neutral salt of lime, possessing no corrosive properties, but merely an affinity for water. A very thin coat of this substance would form a secure covering, if any be needful, without danger of effecting decomposition; but if the tubers be thoroughly sound, I conceive that no application need be made, as nature proves that a potato cut by the spade, in the ground, never becomes rotten, or fails to germinate.

Among the numerous reasons ascribed for the late failures, the most forcible and conclusive appear to be those which embrace the question of injury to the tuber, which causes rottenness of the parenchyma. But all the causes of injury are not enumerated, and one which I have repeatedly urged, though not in this Journal, is not in any way alluded to. The *external coating (epidermis)* of the potato is extremely susceptible of injury from two very opposite agents, *heat* and *cold*. At one time persons were recommended to prevent the germination of the eyes by immersing the tuber for a single second in scalding water; it was stated, that potatoes so heated would never sprout, but be found good for the table throughout the spring and early summer. I tried this scheme, and though I perceived no immediate effects, I, in a week or two, discovered that the pulpy substance to the depth of $\frac{1}{16}$th of an inch below the skin, became soft, pappy, and then advanced rapidly to decomposition; in fact, the cellular substance was seriously injured, and the vital preservative principle destroyed: so much for the vague *dictum* of a visionary wild hypothesis. In 1833, while gathering the remains of a fine crop of many new varieties which I had been favoured with by the President of the Horticultural Society, and a Cornish variety received from a distant county, I had collected the whole into separate heaps to dry and harden. At 5 or 6 P. M. the digging and separation were finished; about 7 P. M. the thermometer had fallen to 2 or 3 degrees below the freezing point, but alarmed by the rapid decrease of temperature, I had hurried the different parcels under cover. However, some time was lost, because it was needful to secure each parcel apart, in order to register the numbers. Many of the parcels were secured before rime appeared upon the grass, but others were exposed too long, and frosty particles glittered upon the skin. I thought no more of the circumstance at the time; and in fact, the cause of alarm existed for a very short period, for the evening became cloudy, and the frosty appearances vanished before 10 P. M. However, when we came to examine the different numbers in March 1834, many were found injured, the skin soft, the mass pulpy and loose, and exactly resembling that of the scalded potato.

Now, it is certain that slight frosts occur frequently at the end of October, and through the course of November; if then, the potatoes be exposed, some must be attacked, and sets taken from such potatoes are very likely to decay in the soil. I do not mean to assert, that disease may not have prevailed in consequence of other causes in a few districts; but of this the reader may be assured, that one certain cause of decay may be traced to frost; and, therefore, it is the duty of every planter to be on his guard, and always to have fern, litter, mats, or some protecting materials at hand, in order to cover the heaps, whenever the evenings threaten to prove severe.

In reference to *radical secretion*, the potato perhaps approaches to an exception; as it can be proved, that the same spot of ground has been cropped with the tubers, for many successive years. The same thing may be asserted concerning the *onion*. May not these facts lead to the surmise, that if any seed-bearing crop produce fibrous roots only, the exuded fecal matters are deposited in the soil; whereas, if bulbs or tubers be formed, the descending laborated fluids are appropriated to the formation of those processes? It is certain that all edible roots (as they are termed), whether they be tuberous, spindle-shaped, or bulbous, are highly sapid, and abound with the peculiar aroma of the plant: fibrous roots are usually insipid, or at least they yield little else beside vegetable extract, void of specific flavour. The subject requires strict attention, for it may lead to many interesting results; however, though successive crops of tubers and bulbs may be produced on the same land, yet I believe they are found to deteriorate after a time, and therefore ought to be alternated occasionally with others which have a system of merely fibrous roots, in order to afford the and every chance of retaining itself in full condition.

## ON THE AMELIORATION OF INDIA.

*The Means of Ameliorating India, deduced from Personal Observations; more especially the Useful Employment of British Subjects and Capital in that Country.* By ARCHIBALD GRAHAM, Surgeon, H. E. I. C. Bombay Establishment.—Glasgow: John Reid & Co. Edinburgh: Oliver & Boyd. Dublin: John Robertson & Co. London: Whittaker & Co. 12mo. 1835.

SMALL as this volume is, it contains materials for much serious reflection. Its theme consists of the improvement of Indian agriculture, and the cultivation of those products of the tropics which are used in the manufactures of Britain; and also of raising the natives of India from mental darkness and horrid superstition, in order to assimulate them with ourselves in religion, liberty, and civilization. The means which the author would employ for accomplishing these great and important amendments are the settlement of British subjects in the interior of India, by the acquisition of landed property, which the new charter of the India Company contemplates and facilitates, who would employ the natives under their superintendence, in the improvement of agriculture and the use of machinery, and whose intelligence, morality, and industry, would exercise a beneficial influence over them;—the establishment of schools for the moral and religious instruction of the young;—and the preaching of the gospel by missionaries throughout the Indian empire. These are great objects, and the means are commensurate for the accomplishment of them; and were those means used by our countrymen, in the spirit of Christian benevolence and equity, we have no fears of the objects desired being attained to the utmost wish of the philanthropist. Whether our belief, however, that those great ends may be accomplished to the extent which the author anticipates, must in a great measure depend on the confidence which we can place in his statements. A personal acquaintance with Mr Graham enables us to coincide in this testimony of him expressed by the Rev. Mr Stowell, rector of Ballaugh, Isle of Man, in the preface. "It (the author's book) communicates the fruits of personal observation, during a series of years spent in India in the Honourable Company's service. It comes from the pen of an individual of unquestionable veracity and genuine benevolence, whose statements may be relied on with entire confidence. They are not the crude theories of a mercenary speculator, formed without any sufficient data; nor the impracticable plans of a visionary adventurer, but the results of judicious experiment and accurate investigation. The design of the writer is to shew how the welfare of India may most effectually be promoted. His residence in that interesting country has powerfully drawn forth his sympathies towards the native population, with whom he appears to have cultivated much kindly intercourse. His profession brought him into close contact with all the various castes of the Hindoos, and gave him an opportunity of becoming intimately acquainted with their personal, domestic, and national habits."

The practicability of the means indicated by Mr Graham, affecting the entire amelioration of India, is rendered the more probable, from the nature of the *principle* upon which they are founded. He proposes to employ the *moral* influence only of the British character, to attain this great object. It was this moral influence that was really the power which effected the conquest of that vast territory, and that has kept it under our dominion ever since, and which, if rightly directed, as advocated by Mr Graham, will continue to attach the many millions who inhabit it to our interests. That influence has gradually become more benign in its aspect towards the natives, since the first Briton planted his foot on Indian ground. At first it struck a superstitious awe into the natives, it now commands respect, and the means of amelioration advocated by our author will strengthen that respect into esteem and confidence. It is interesting to trace the progress of this moral influence in the history of India. The first Englishmen, who went to that continent on private adventure, being medical men, created great astonishment at what was considered the extraordinary cures of some of the native princes. The handful of British who subsequently won the battle of Plassey, under Clive, against an immense army of native men and horse, struck terror throughout the whole country. The Brahmins superstitiously represented the " white men who wear hats" as having sprung out of the sea, or as a wild people who came suddenly out of the deserts. The unseen and supposed extent of power at home, caused by the successive and great victories achieved over the native powers, threw a mystery and alarm around the English. "I am not alarmed at what I see of the forces and resources of the Company," said Hyder Ali, with emphasis, "*but at what is unseen.*"

Great as was the fear which they at first felt at the English, the natives soon learned to discern the great difference in the principles which actuated their old and new masters. Under the government of the native princes, the people were held in perpetual thraldom, by tyranny and the most degraded superstition. The force of caste enabled the governments to rule with a rod of iron. The whole country was a frequent prey to intestine commotions. Wars frequently broke out from the personal conflicting interests of different rajahs. Villages were sacked and plundered with impunity. These distressing evils became yearly more extended under the corruption, immorality, and weakness of the native governments,—circumstances the most unfavourable that can be conceived to the improvement of a country. These evils have either altogether disappeared, or have been much mitigated under the British sway. Rapine and plunder have ceased throughout the land. The rajahs are now deprived of the power to tyrannise over the people. The predatory tribes have betaken themselves to agriculture and industrial subsistence. Exemption from the punishment of capital crimes is not now so extensively tolerated. The spiritual power of the priesthood is much lessened. Superstition is subsiding. The low caste of boys find themselves placed at schools, more on a footing of equality with those of the higher grades, and their intellect, naturally acute, is fostered and improved. The funeral pile does not now blaze so uninterruptedly around the ashes of its victims; nor do the wheels of Jauggernaut now immolate so many thousands of his votaries.

But confessedly advantageous as these changes are, they are far from rendering India prosperous and happy. Exemption from former evils is only a negative, not a positive good; although attempts at promoting positive advantages would have been frustrated so long as those evils existed. Now that the baneful effects of them have been removed by wise resolutions, the time has arrived to cherish and develope the internal resources of India to the best advantage. Proper knowledge and skilful employment of these resources are essential to restore the ruined condition of the natives, and to raise them to wealth and prosperity. One circumstance more than any other has depressed the energies of the natives, and that is, instead of employing the resources of India to the mutual advantage of the people of both countries, our countrymen have regarded it only as the mine from whence riches to themselves only ought to be dug. "Immense fortunes have been accumulated there," says Mr Graham, "and afterwards spent in England. Many of the English families owe all their affluence to the East. Many of them have found in it a sphere of lucrative and honourable employment for their younger branches. Sons have sent remittances thence to support their parents or other friends in ease and comfort. Merchants have found there a ready and extensive market for their goods. India has poured a stream of wealth into Great Britain, which loudly calls for gratitude. Surely it becomes a great nation to arouse from her apathy, for the many millions of her eastern subjects, to call to mind her sacred obligations, and to reflect for what purpose such a noble possession has been placed in her hands. We need hardly ask," continues Mr Graham, "whether we have acquitted ourselves of these obligations, or whether we have made a suitable return to India for the immense sums of which we have deprived her. The almost universal feeling in England is disappointment with regard to the improvement which has hitherto been effected in the condition of our eastern provinces."

The notion of regarding the East Indies as a source of unbounded wealth, which is entertained by all the young people of this country who go there, is an erroneous one. We do not remember seeing so graphic a description as this of Mr Graham's, of the first impressions on our countrymen on landing in India.

---

* This erroneous idea of the state of India, may be formed by him who merely visits one or all of the three great cities—Calcutta, Madras, or Bombay, or perhaps some of the other chief places where the English are stationed. In the former, he will find the principal officers of the government, and the wealthy English and native merchants, residing. He will see all the pomp and luxury that riches can command, and be dazzled with the different costumes and manners of the Eastern nations. In Bombay, he will behold the Englishman rolling softly along in his carriage, dressed in white jacket and round hat; the active Parsee or fire-worshipper, following in his large coach,

accompanied by his friends, all of them having large upright turbans, smooth faces, and dark mustachoes, and dressed in loose white robes, with a handsome girdle round the loins. Numbers of the same caste may be seen in the evening, ranged along the beautifully placid sea shore, muttering their orisons to that glorious luminary, the setting sun, then burnishing with his last golden rays the western sky. The fort of Bombay has a beautiful appearance. It is strong and extensive, with a handsome glacis, called the esplanade, sloping down from it. Passing along this, the attention of a stranger will also be attracted by palanquins, hurrying along with gentlemen, luxuriously reclining, borne along on the shoulders of the Kamathe Hamâl, or bearer, with brawny limbs, and only a cloth round his loins, a plain turban, sandals on his feet, large silver bracelets ornamenting his arms, and golden rings his ears. Near the wells, the upright Hindoo, or fair Parsee woman, may be seen gracefully balancing on her head several pitchers, one above the other, full of water. The silver rings on her toes make a jingling noise as she moves along. Massy silver rings decorate her legs, numerous bracelets her arms, and golden ones her ears and nose. The stern Arab may also be seen stalking sedately amongst the crowd, with his long flowing black beard, and a rosary in his hand. On the roads are to be descried Armenians, Jews, Portuguese, Chinese, Rajpoots, Moguls, and the different classes of Musselmen and Hindoos in their various costumes. The young cadet also lately arrived from England, and now left to act for himself in this new world, and ready to follow the habits of those around him, is seen riding rapidly along, on his way to the mess, proud of his red jacket and brilliant cap, and the prancing Arab steed which he has just purchased. On the several roads leading through the densely peopled neighbouring villages, are to be seen numerous native carriages, some with a pair of bullocks, trotting along, with bells hanging from their necks, others with curtains drawn closely round to conceal the inmates, some with a single horse, driving rapidly, with three or four Hindoo clerks, returning to their homes from office, sitting on cushions back to back, conversing, perhaps, about the different documents they have been transcribing, and bearing on their foreheads the distinguishing mark of their sect. On the right, one of the finest bays or harbours in the world comes into view, from which the Ghauts appear in soft and majestic grandeur at a distance, while nearer lie the islands of Calaba, Bombay, and Salsette, studded with many villages, and beautiful bungalows peeping from between the numerous lofty cocoa nut trees, and different species of the elegant palm, forming altogether one of the most magnificent and lovely oriental scenes the eye can rest upon. The sight of so many English ships gently pressing the bosom of the deep, brings to recollection the immense oceans that they have had to traverse, and the humble manner in which that nation sought for a share in the traffic of the East; while the fort, with its bold front, marks the character it has now assumed.

"A stranger passing from Bombay to any of the principal stations where the English reside, will be amused at the Eastern mode of travelling, and at the appearance of the different persons he may meet on the road. Before the traveller has advanced far, he may espy a line of camels carrying tents, or loaded with merchandise, whilst on the back of the foremost the driver is perched at a considerable height, seated on the baggage. The long bending necks, awkward legs, and peculiar gait of the camels, will attract his attention, and their curious mode of kneeling down to allow the baggage to be removed or buckled on, will call forth his admiration. His eye may next rest on the diminutive ponies of the country, as they pass and repass, variously loaded, accompanied with native drivers, almost as devoid of clothes as the animals they conduct. His ear will now be saluted with the continual tinkling of bells, depending from the necks of bullocks, plodding their weary way under bags of grain and other country produce. Conspicuous amongst the drove, are seen some painted horns, elongated by ornamented sticks attached to them; these mark the favourite bullocks. A band of those native Sepoys, who assisted us in conquering their country, may be overtaken on the road, who appear joyous at having obtained leave of absence for six months, to go, it may be, as far as the distant presidency of Bengal, that they may again behold the friends they had left in their youth. Some of them, perhaps, are returning to solace their aged parents with their company, and contribute to their comfort, by throwing into their laps the savings from their monthly pay. Others of them, it may be, with less noble purposes, are seeking the quiet of home, and a temporary freedom from the drudgery of drill, or the fatigues of war. Most of them, he will observe, are mounted on the ponies peculiar to the country, each of them uniting the valour of the hero with the qualifications of the cook. Here a sword or other martial implement, proclaims the warrior, whilst dangling on the other side, brass cups and plates, with clattering noise, betray the cook. Carefully strapped, may be discerned the iron plate upon which, in the heat of the day, they cook their cakes under the shade of some sheltering tree. Nor will the European observer fail to remark how proudly every one displays his red jacket, conscious that it confers on him a character and influence which will easily enable him to take advantage of the humble villagers as he travels along. Conveyances of different kinds may occasionally be met with. Carts with pairs of bullocks containing supplies for the troops. Mahomedan servants proceeding on ponies in advance of their master, to prepare the way, and have every thing ready for him at the next halting ground. Natives may be observed hastening along, each with a pole over his shoulder, at either end of which dangles a chair, table, or other piece of European furniture. They wonder at our luxurious habits, which seem to them exceedingly superfluous, as mother earth supplies them gratis with table, chair, and bed. Cantering along, the Sahib himself comes up, dressed in white, and mounted on a handsome Arab horse. Palanquins, containing his lady and her family, next reach the halting ground, which are put down, perhaps, at the door of the tent, when the weary bearers gladly mutter thanks to some protecting power, and run to drink water at the refreshing well or tank, lifting it up to their mouths in the hollow of their hands. Inspiring dread, admiration, and wonder, the pompous Elephant bearing on his back the magnificent Houdah, may perchance be met, marking the wealth and luxury of its possessor."

These are all gay glittering objects which the stranger will see around him in the maritime cities and suburbs in India; but let us pass into the interior of the country, and contemplate "this" picture as well as "that."

"Each of the miserable villages," says Mr Graham, "which he sees around him, must contribute a fixed yearly land-tax for the support of the government; and the secret toil which gave that life, display, and grandeur to the rich city the stranger first beheld, and wealth, power, and consequence to its luxurious inhabitants, must almost all be derived from the humble cultivator of the soil. Should the white face of the European stranger be seen within the walls of a village, the wild dogs of the place will keep up an incessant barking, the cows and very cattle seem afraid of him, the females conceal their faces as he passes, and the children run in to their parents quite terrified. Should he pass by the abode of a Brahmin, or one of the more wealthy class, he will generally see it built of mud, and destitute of windows, with a flat roof. The form of the building is generally square, with an open court-yard in the centre, to secure the cattle. Towards this court-yard, the house is open, the roof on that side being supported, not by a solid wall, but by wooden posts placed at certain distances. From the street or lane of the village, nothing can be known of what is going on within the precincts of the little court-yard and house, and nothing can be seen but a high mud wall, and strong door, admitting the ingress and egress of the people and cattle. Should the stranger look within his door, the whole family will be thrown into the greatest commotion; the females will conceal themselves in the farther chambers; the head of the family approaches, remains silent, yet seems determined that the stranger shall not advance to defile his cooking place, round which are several brass pots. Nothing is to be seen which, in the English sense of the word, may be called furniture. If the stranger enter the hut of the common cultivator, he will find the alarm of the natives much less; the door is so low that he can scarcely enter, and when he has reached the interior, it is full of smoke—such a thing as a chimney has not yet been thought of. Near the cooking spot, are piles of common earthen pots, containing salt, onions, and red pepper, and old bags and dirty cloths with spices. In one corner, stands the large round basket containing the family grain, and on the floor are the two stones for grinding the daily allowance of meal, near which naked children are crawling up and down. It is impossible to stand upright, without danger to the head, against the cross sticks which support the flat roof. Opening from this room is another—the family sleeping apartment—here all is pitch dark, and the beds are lying on the ground. The stranger will now be glad to reach the pure air outside, where he may observe the rude Hindoo implements of husbandry, not in use, lying at the door, and see the cultivator's lean, worn-out bullocks, which have been toiling all day, eating their scanty allowance of provender for the night. It will be long before a stranger can learn the real feelings of such a people. Fear still rules over them. But through much kindness, and long continued intercourse, they will, at length, express their sentiments of the government, and will say that 'we have indeed still peace and security under the British, but are fast becoming a country of beggars.' No benevolent mind," exclaims Mr Graham, "can contemplate such a degree of discomfort and wretchedness in the condition of a people under the British government, without a desire to remove the causes from whence these evils have arisen, and to introduce among our fellow-subjects as many of the blessings of civilization as are in our power to bestow."

The ignorance which prevails in this country of the real condition of the natives of India, is thus rationally accounted for by Mr Graham; and were the permission which is granted by the new charter, to settlers to possess land in that country, made a proper use of on their part, there can be no reason to doubt that the soil and climate of India, which are eminently qualified to produce the richest products of the tropics, might be made subservient to the mutual advantage of Europeans and natives.

"Those few Englishmen," says Mr Graham, "who have hitherto been permitted to go out to India, have, for the most part, been young men about eighteen years of age, who have perhaps received merely the rudiments of their education on leaving England, and that education seldom or never embracing either a knowledge of the principles of science, or a practical acquaintance with any of the useful arts. They are intended to direct the talents of a rude people only in a military capacity, a people with whom they have no common interest, either in the soil or any of their pursuits. They are all prevented by their rank, occupations, and habits, from knowing the real state of the natives; and, being obliged to move about the country wherever they are ordered, are thus necessarily disqualified, by the circumstances in which they are placed, from unfolding the resources and capabilities of our Eastern Empire. But were a class of men who had been differently educated to settle in India, with different objects of pursuit than those to which the attention of the military servants of the Company has been directed, we might reasonably hope that other results would flow from their presence and influence, than we have hitherto witnessed. It is only now, when the unrestrained employment, in the East, of men matured in British skill and enterprise is permitted, that we may expect the resources of the country to be gradually developed, the arts to flourish, the people to be enriched and improved, and the various products of India made extensively available to Great Britain.

"As it cannot, however, be expected that men who possess the requisite funds and character, should engage in such an enterprize as that we have suggested, without some prospect of remuneration, we will attempt to show, that there is in India an immense unoccupied field for the employment of British capital and skill, in rearing the various products for which there already exists, or may easily be created, a great demand."

Although the whole of British India is suitable to the settlement of Europeans, and Mr Graham's remarks are capable of universal application, yet, as he has only served in the Bombay Establishment, he prudentially restricts his observations to the improvement of that presidency, and particularly to that portion of it with which he is familiarly acquainted,—the Deccan. The

Deccan consists of high table lands, situate beyond the mountainous barriers called the Western Ghauts, and contains a black soil, which is represented by Dr Marshall, the Bombay reporter on statistics, as capable of bearing every species of produce and of inexhaustible fertility. In this delightful region Mr Graham tried the raising of silk, and his experiments have established this previous doubtful position, that mulberry trees thrive in India for silk-worms better than in Italy. In Italy the mulberry can only be stripped of its leaves once in the year, whereas in India it may be stripped with impunity six times in a year, for food to silk worms, thereby producing six crops of silk in that time. The great quantity of additional raw silk which could thus be annually brought into the British market, the very low prices of labour in the Deccan, L.3, 12s. a-year for a man without victuals; and the extreme nimbleness of the fingers of the Hindoo women in winding the raw silk from the cocoons; all these favourable circumstances combined, would ensure a preference for Indian silk on account of its cheapness; and as to its quality, the Chinaman, whom Mr Graham employed at Ahmudnuggen to superintend his experimental establishment, stated that the Deccan is as capable of growing fine and strong silk as China itself. The four and a half millions of raw and thrown silk imported into Britain might be doubled or trebled from India, and the importation of those articles from Italy and France might be rendered unnecessary.

In 1832 Mr Graham drew up a report to the collector at Ahmudnuggur, of the success of his experiment in raising silk, from which we extract this interesting account of the Chinese method of feeding the silk worms, and winding the silk from the cocoons employed.

“ The feeding of the worms, and reeling of the silk, is conducted by two Chinamen, one of whom was brought by a rich native merchant privately from China, for the purpose of introducing the silk cultivation into the island of Salsette, and whom he afterwards made over to me. The mode of feeding practised by them, is altogether different from that in use among the Italians. The former expend a greater quantity of leaf than the latter, at each meal given to the worms, their object being to hasten them to the period of maturity as soon as possible. The Chinese mode of cleaning and removing the worms, is much more simple than the Italian. A quantity of leaves is tightly rolled up into a hard mass, and cut with a large knife into minute pieces. These pieces are lightly scattered over the worms, which immediately rise from the old leaf below them, to the surface of the new. The Chinaman then rolls up the worms gently in the new layer of soft leaf, leaving the dirt and old leaf with any of the sickly worms below; he then carries his roll with the worms to a nice, clean, new tray or basket, and carefully spreads it out. The sickly worms he picks out from the decayed old leaves, and gives them a separate place to feed in. Great care is taken to give the worms sufficient room as they increase in size. The Chinese frame on which the worms are placed, when they begin to assume their golden colour, and throw out silky traces, is curious, and consists of a great number of slight loops made of bamboo cuttings, among which the worms are thickly set to form their cocoons. During this period, they expose these frames to the open air, which circulates freely among the loops, and by drying up the gummy fluid which the worms throw out copiously when they are spinning, hardens the cocoons, and renders them fit for the future operation of reeling.

" In three or four days, the worms, having finished their cocoons, are destroyed by baking them, otherwise, in about ten days, they would burst out as moths, and ruin the cocoons for reeling.

"The Chinamen brought a very simple reeling machine with them secretly from China. The reeling, as conducted by the Chinese, is a very simple and interesting process. First of all he fixes a small jar on the ground, kindles within it a charcoal fire, and sets upon it a basin of water. As soon as the water has attained a certain temperature, he throws into it the cocoons or silk balls which have been made by the worms. While these are softening, he places upon the broad edge of the basin, his small wheel, which is made of very slight materials, such as bamboo cuttings. It is only about two and a half inches in diameter, and has a small eye in front of its stand, through which the thread of the silk is to pass as it rises out of the basin, that it may be cleaned from too much moisture, and all adventitious matter. Last of all, he brings his large reeling wheel on which the skeins of silk are to be wound, and places it at the left hand side of the fire and basin. Every thing being now ready, the Chinaman sits down in front of the whole, with his two chop-sticks, putting one of these betwixt the fore and middle fingers, and the other betwixt the middle and ring fingers of his right hand, he uses them as dexterously as if they were two fingers elongated, without any danger of feeling the scalding pain of the hot water. With these chop-sticks he stirs the silk balls about, till the gum which glues their threads together be dissolved; then he unravels a certain number of them until they run freely, makes up eight or ten of them into one common thread, and passes it through the small eye in front of the stand of the small wheel. He then conveys this thread from the eye over the top of the small wheel, brings it back again by the bottom, and twists it round the thread several times, into a kind of easily running knot, which gives the whole thread compactness and strength as it passes on to the large reeling wheel, to one of the spokes of which he now ties it. This being done, he moves gently the large wheel with his left hand, the turning of which winds up the silken thread, and causes the small wheel to revolve, and in this manner unravels the cocoons. While his left hand is thus employed, he gives, with the chop-sticks in his right, a slight rotatory motion to the cocoons in the basin, producing a small vortex in the water, round which he keeps them continually revolving. Every thing being thus began and going smoothly on, he increases the speed of the wheels, and manifests the utmost dexterity in the use of the chop-sticks. He keeps up the vortex in the basin of water, throws out the exuviæ or skins that remain after the thread is run off, preserves the threads in clear running order, prevents them breaking or entangling, and keeps up the same number. When one of the cocoons is nearly run out, he pushes another with his chop-stick into the heart of the vortex, and it is immediately drawn up into the common thread."

The growth of cotton might be much increased in India. There are ten distinct species of this plant known, of which there are many varieties. Of these species two, the *Gossypium Indicum* and *arboreum*, are natives of India. The cotton wool imported from India does not bear so high a character in the British market as the American. The American cotton plant is the *Gossypium herbaceum;* but the inferiority of Indian cotton wool arises not so much from the difference of the species, as from the mode of managing and gathering the crop. In America the cotton wool is gathered carefully by the hand, generally by women and children, from the pod as it ripens, and placed in bags suspended from the necks of the gatherers. The locks of wool which fall on the ground are gathered and kept separate from the rest. The Indian cotton is gathered all at once, whether it is thoroughly ripened or not; and it is thrown on the ground to dry and won. The mixture of the earth and brittle pods with the cotton, by this excessive carelessness, renders it dirty and unfit for the delicate machines of this country. The imports of this article into Britain will shew the superiority which the Americans at present maintain over our Indian brethren. The quantity of American cotton spun in 1832 amounted to 212,313,696 lb., whilst the East Indian of the same year only amounted to 18,287,280 lb. The total import of cotton, in 1832, was 270,690,000 lb., of which 229,007,272 lb. came from America, the whole American crop in that year amounting to little more than the importation from America, viz. 296,245,009 lb.*

Sugar is an article which may be raised to any extent in India; but until it is manufactured in a manner very different from the present, all reduction or equalization of the duty will never make East India sugar an acceptable commodity in our markets. Considerable quantities, imported from Mauritius and India, are sold in retail to ignorant people as the best West India sugar, at prices far above its intrinsic value. The culture of sugar is simple enough in India, but it is very slovenly. The squeezing of the juice from the cane is clumsily effected; and after the liquid is nearly evaporated, no farther care is taken of it, the residium being not true sugar, but sugar mixed with treacle. The red and black canes are sold in the markets, or at the gates of the cities, at a halfpenny for three or four large canes, to passengers, who chew them as they walk along.

---

* M'Culloch's Commercial Dictionary, Article *Cotton*.

There is no reason to doubt that the tea plant would grow in India as well as in China. It has hitherto been the policy of the East India Company to discourage the culture of this plant, on account of the lucrative barter carried on by them in opium with the Chinese. Now that the tea trade has been thrown open, and settlers permitted to acquire property in India, it is probable that the raising of tea will soon attract the notice of cultivators. Indeed, it has been lately stated, that the tea plant has been found growing naturally in the district of Assam.

Coffee would grow well in the Deccan. The coffee grown at Columbo, in Ceylon, by the enterprise of some gentlemen, has already attained a high character, and is returning an ample remuneration. Indeed, the coffee from the Malabar coast is so good, that it is shipped for Mocha, and thence re-exported as genuine Arabian coffee. Indigo has been tried in the west of India, in Guzerat, and has been found to succeed well. The cochineal insect (*Coccus Cacti*) might be produced where the cochineal cactus (*Cactus cochinellifer*) can grow.

All the varieties of oils, gums, dyes, and drugs, peculiar to he lower regions of the temperate and of the tropical zones, might be raised in India, as well as the minute and rare luxuries, which acquire a value only in the highest state of civilized society, such as shawls, odours, and jewels.

Mr Graham is of opinion that many of our implements of husbandry would greatly benefit the agriculture of India. The iron plough would be a happy substitute for the Indian, made of the hard babul wood, which only scratches the ground. The light one-horse cart would be of essential service to the Hindoo, in lieu of his clumsy waggon. The thrashing-mill would also prove a benefit, in clearing every species of grain from the haulm and straw, which at present are tramped out by the feet of oxen. The winnowing-machine would be as useful as the thrashing-mill, the process of winnowing being performed by a man standing on a high stool, and letting the grain fall gently, while the chaff is carried away before the wind, when there is any. Mills for grinding corn by water or steam would save the Hindoo much manual labour, in grinding his daily meal, between two stones, for his family use. Such a trade as a miller is therefore unknown in India. On the other hand, several plants and practices of the natives of India might be introduced into this country, to the benefit of the arts. The Bajaree (*Holcus spicatus*) and the Jowaree (*Holcus sorghum*) are prolific grains, and capable of maintaining a very dense population. One head of each contains from 400 to 500 grains, and sometimes as many as 2000. The mode in which the natives tan leather might deserve our notice. Scarcely three or four days intervene between the killing of the animals and the wearing of the shoes made from the hides. This dispatch is owing to the very astringent powers of the Indian barks, with which the English tanners are unacquainted. The finer oils of India would be much better for the softening and pliability of leather, than the coarse cod oil and tallow employed in this country. In short, Mr Graham "could have made a longer list of the productions of India, which would shew the mutual advantages which would arise to both countries from the same extensive employment of our countrymen and their capital in India; but he trusts that the few suggestions which he has been enabled to offer, will be sufficient to evince the importance of our Indian possessions, to induce some of our enterprising countrymen to form new settlements in that interesting region. By the cultivation of the various products of the East, and by the introduction of British arts and British commerce, such settlers may confidently hope, under the divine blessing, to reap a rich and abundant harvest." (p. 80.)

But besides the physical, the moral condition of India must be ameliorated, before we can reasonably expect to derive all the advantages in cultivation which have been enumerated. This moral amelioration may be effected through the two immediate instruments of schools and missions, whose influence must be strengthened by the intelligence and good conduct of the settlers. Education, imparted so as to convey Christian knowledge, is the only immediate means which this country possesses to dispel the intellectual and moral darkness of India; but experience warrants us in affirming, that such an education can assuredly dissever that chain of *castes* which is the bane of India. But the present system of general education is, we fear, not able to effect this desirable end.

"This system is pernicious in two ways," says Mr Graham, "both in leaving the intellectual powers undisciplined, and by imbuing the heart with notions on religious subjects, which tend to mislead and corrupt it. In the village schools, reading, writing, and a slight acquaintance with accounts, constitute the extent of knowledge attained by the boys. Beyond these, the masters themselves are not qualified to give instruction. The books which are given them to read, consist of portions translated from the Sanscrit, such as the Ram Heigia, or the adventures of their god Ram against Ceylon, which they sometimes peruse. These writings, instead of elevating the mind, by presenting proper ideas of the Supreme Being, fill the imagination of the young with impure conceptions, and lay the foundation for much of that immorality by which these unhappy creatures are distinguished after they have attained to manhood. The very low state of education among the Hindoos, may be known from the result of some inquiries which the writer of these lines made, at the request of Sir John Malcolm, into the nature and extent of native education in the large district of Ahmudnuggur, which, in 1829, contained 125 villages. Some of these were considerable towns, with a population of several thousands. In the whole there were only 2906 boys attending schools.[*] The number of masters was 164, and the whole amount of their income, paid partly in kind, by each pupil bringing two handfuls of grain every morning, and partly in cash, was 573 rupees, or about L.60 English money. It was thought interesting to ascertain what effect the British sway might have had in advancing the lower orders to the blessings of education, and in breaking that chain of castes which has hitherto excluded them from improving their mental powers. The proportion of the different castes of school-boys throughout the district could not be known, on account of many of the villages having omitted to notice this in their returns. It was, however, ascertained in the city of Ahmudnuggur, which contains about 16,000 inhabitants, that there were 209 boys attending the native schools, and of these one-half only were Brahmins, the rest being composed of the agricultural and other classes, excepting the very lowest grade, such as the caste of leather-workers, which cannot be admitted into any school lest they defile the others. These acquire sometimes a little reading and writing from the priests of their own order, but this is rare. The number of children of lower castes at schools, it is generally acknowledged, has of late years been gradually increasing. This circumstance seems to be owing to the Government admitting them to many situations from which they were formerly excluded; for all natives shew an exclusive concern for their secular interests, without any reference to the enlargement of the mind. The agricultural classes of India, it must be acknowledged, do not possess that degree of intelligence and capital which it is desirable an agricultural community should have, and are all obliged to labour for a bare support, derived from the cheapest kind of food, furnished from the edible grains, of which a sufficient quantity for a working man may be procured for about twopence daily. The power which mental improvement gives to the Brahmins and higher grades, has always been, and is employed to the spoliation and depression of the cultivators. It would be of much consequence to the latter, having more extended intercourse with Europeans, by which they would be raised to a greater degree of intellectual improvement, which would prevent them becoming a prey to others, and elevate them above their present wretched poverty.

---

[*] This calculation does not include the Education Society's Schools in the district, consisting of about 234 boys

" It cannot be expected that England could easily instruct her many millions of Eastern subjects, and, of course, her endeavours to procure such a blessing must be very limited, without the desire for knowledge in the people themselves. That this desire is still at a very low ebb, may be easily known from the irregular attendance of the boys at school; from the anxious wish they have to enter into offices, where they will remain for many years without pay, in the hope of obtaining a situation by subservience to the will of those in authority; and also from the fact of females never being educated in India, and thought unworthy of rational improvement.

" The manner in which the boys are educated is very simple. The figures or letters are first drawn on a sand board, and the child follows them all day with a pencil, repeating their sounds: by this means they acquire reading and writing simultaneously. At the evening's lesson the boys all stand up, and one of them by turns sings out the letters or figures, and all the others join in the song. In some villages the pay of the masters amounts only to four or five shillings monthly, and it is surprising how they can manage to live upon such a scanty pittance; but the necessary consequence is, that the situation is often occupied by men of the lowest attainments.

" On this important subject the writer may be allowed to remark, that the means at present made use of among the natives at school, in the domestic circle, and in their associations with each other, are not, as far as he can judge, at all adequate to the important purpose of improving the mind. On the contrary, they tend to debase and corrupt it. Yet there can be little doubt but that the benevolent exertions of our countrymen might find an ample field for benefiting this benighted portion of their fellow-subjects, by making improvements in the village schools, in which the boys might have a far different train of virtuous and intellectual ideas imparted to them, by which the influence of a vicious and ignorant society would be greatly counteracted."

Successful experiments have been made of a superior mode of teaching, to the system of the Education Society by missionaries of the Scotch and English churches, and from America. These missionaries have had no difficulty in sweeping from the schools *all* the native legends, and introducing the Scriptures and other Christian books; and their success is evinced from the fact, that their schools are now better attended than those of the Education Society. The Scottish Mission has 70 schools, containing 3000 scholars, and it is only the want of funds and teachers that prevent their being carried to any extent. The Assembly's schools at Calcutta contain 550 pupils, and might be increased to any extent. Nearly 100 are in the daily and careful study of the Scriptures, and all the rest are training to the same privilege. According to the last account of these schools, "the highest scholars," says Mr Graham, "had read the four Gospels, several of the Epistles, and portions of the Old Testament. They had a minute acquaintance with the evidences, and knew as much of the doctrines, of Christianity systematically, as is to be found in the first six of Scott's Essays. In mathematics, they had thoroughly mastered the first six books of Euclid, land-surveying, logarithms, and algebra, as far as quadratic equations. In history, they had read from the creation to the birth of Christ, and were examined *ad aperturam libri*. They had made similar progress in geography, physical and political, and the use of the globes." It must be confessed that strong prejudice exists among Europeans against missionaries. Were they at all like too many of those who have unhappily been permitted to roam at large among our West India islands, there would be great cause for apprehension for the safety of our Eastern empire. "But never were men better adapted," says Mr Graham, "for the noble enterprise, than the English, Scotch, and American missionaries," several of whom he has known in Guzerat and the Deccan. They were thoroughly conversant with the native language, the various dialects of which are very difficult of acquirement. They could contend with the cunning Brahmins on the absurdities of their mythology, and maintain open discussion with them in presence of the common people. "Of the missionaries here alluded to," Mr Graham expresses himself warmly, "it is not too much to say that they unite harmlessness with sagacity, and simplicity with purity. They are devoid of all selfishness, and *never interfere in political concerns;* their only arguments are the words of wisdom and truth, and their only armour the panoply of faith and hope."

But if Europeans are objectionable as missionaries, the natives cannot be objectionable missionaries to themselves. With the view of educating natives as teachers and preachers to their benighted countrymen, a college was established some years ago at Vellore, we believe, under the superintendence of Dr Doran, a clergyman of the church of Ireland. This college is attended by at least 300 young natives, who evince an ardent desire for education, and of imparting its blessings to their ignorant and superstitious countrymen. We have had the pleasure of meeting Dr Doran both in public and private, and have heard him with delight bear testimony to the intellectual capacity of the young natives to comprehend the abstruser portions of scientific and theological knowledge. The superstition of the Hindoo is of the darkest character, and yet the case of these young men who attend this college proves that the light of the gospel can dispel that darkness, and that heathens appreciate that light when their eyes are opened to it.

It is melancholy to peruse the recorded instances of superstition as given by Mr Graham. Without looking at the awful picture in full light, suffice it to shew thus much of it as that the Hindoo never regards himself as a responsible moral agent, but supposes himself a part of the Supreme Spirit. Hence every evil act is attributed to God. He supposes Divinity to pervade all things, and worships him in men, beasts, reptiles, rivers, and stones. He has no idea of hell, and fears no worse fate than that of merely sinking into a lower state of animal creation; nor of heaven, and anticipates no higher happiness than that of approaching the essence of the Deity. He reserves to himself the merit of all good actions. Hence his fastings, privations, washings, pilgrimages. Even in domestic and social intercourse, the Hindoo is a corrupt being. The Hindoo ploughman, during the labours of the day, sings the impure songs of his god Krashna, and at night listens with pleasure to some one in the family circle reading the legends which describe the freaks of the object of his worship, in the character of Gopaul, a shepherd, granting to all a free license to sin. The same ploughman has in the field, or at his well, some protecting evil spirit, which he calls the " terrible," of whom he makes a representation in any common round stone lying near him, covering it over with red paint, and saluting it always before beginning his daily labour. At the annual festival of the Polah, bullocks, attired with garlands and dresses, are paraded through the streets and worshipped. The whole inhabitants of a village will sometimes go out and worship the serpent, offering it rice, milk, &c. A buffalo is yearly led round the village and slain at the entrance of the gate. Its blood is supposed to protect those who touch it from all evil for that year. No Sabbath is observed by the Hindoo; no day of rest to relieve himself from worldly cares and anxieties, or to refresh his wearied cattle. The want of a pleasant interval between the Hindoo holidays is foolishly attempted to be remedied by the great number of days during which each of these continues; but this leaves a satiety, and encourages indolence in the mind, and constrains it to return to its usual occupations with reluctance and disgust. Under these degrading circumstances, who can doubt, in the concluding words of Mr Graham, that " by the extensive employment of Englishmen in India, by their skill in the arts and sciences, by their presence and influence, and by the neutral ground which, it is hoped, they will assume among all castes of natives, prejudices would be overcome, the knavery and oppression of the Brahmins would be prevented, the minds of the lower classes would be cultivated and enlightened, and their attachment to the English government would be excited and secured?"

---

## ON DRAINING AND EMBANKING.

*Systematic Treatise on Draining Land according to the most approved methods; and on Sea, River, and Lake Embankments, &c.* By JOHN JOHNSTONE, Land-surveyor, Edinburgh. 3d edit., revised and enlarged. 1 vol. 4to, 25 plates. W. Blackwood & Sons, Edinburgh; Cadell, London; W. Curry & Co. Dublin. 1834.

THE importance of *draining*, as a primary means of improv ng waste and unproductive land, is a subject on which practical agriculturists are unanimous in their opinions. It constitutes, indeed, in a majority of cases, a *sine qua non*, a fundamental basis, without which all other means, however tedious, laborious, or expensive, will prove utterly ineffectual for accomplishing the object in view. Such being its importance in the practice of agriculture, it consequently becomes a matter of the highest interest to persons engaged in agricultural pursuits to make themselves thoroughly acquainted with the theoretical principles of the art, as well as with its practical details. In devoting a few pages of our present number to the notice of the valuable treatise on the subject mentioned above, we will endeavour to give a condensed view of the scientific principles on which this improved system is founded; premising, however, that any remarks or extracts we can have room for will present only a meagre sketch, and that it will be necessary for our readers to consult Mr Johnstone's work, to enable them to become sufficiently versed in the theory and practical operations of draining.

The present improved system of the art of draining is founded essentially on geological principles, with the study of which science indeed it is almost coeval. Though the art was known and practised by the Romans, as we find in the writings of Cato, Columella, and Pliny; and though, from remains which have been discovered, we find that it had been practised at an early period in Britain; yet it was not till towards the end of the last century that science was made to bear upon its improvement, and that it was established on more unerring and uniform principles. "To proceed with certainty in the art of draining," says Mr Johnstone, "it is necessary to ascertain the causes which produce that wetness in land, of the different appearances which, according to soil and situation, it assumes. It proceeds either from *rain-water* stagnating on the surface, where that is impervious, and has no descent; or from the *water of springs* issuing over, or confined under it. On clay soils, wetness is commonly produced by the first of these causes, but in a variety of cases it proceeds from the latter. A knowledge of the causes and nature of springs, therefore, is closely connected with the principles of draining," and that can be attained only by investigating the structure of the earth's upper crust, and the nature of the different strata composing it.

These strata we find on examination to be of opposite degrees of consistence, and consequently of a *porous* or absorbent, and of an *impervious* or adhesive quality—and to be disposed with more or less regularity in every situation; and we also find that they follow with considerable uniformity the undulations of the surface, so as to reach the tops of hilly or elevated ground, on which they must consequently lie in an inclined position, favourable to the passage of water. Those strata, however, which lie nearest to the surface, are found on ascending elevations to terminate before reaching the summit, as if broken by the original heaving or elevating of the ground in those parts; so that we frequently find a clayey or other impervious stratum extending for only a short distance above the base of a hill, while more porous strata encircle its top. These, from their elevated situation, receive the largest quantity of moisture, from the descending rain, from dews, or from the humidity of the atmosphere, which condenses more copiously than in lower situations: the moisture, thus received, gradually percolates through their open or porous substance, until it meets obstruction from some impervious body, when it accumulates, and forces a passage to the surface of the adjoining lower grounds. Here it may be observed either oozing almost imperceptibly, or bursting in stronger springs from the edge of the overlapping stratum, while the ground above remains quite dry.

By intercepting these springs, on thus rising to the surface, and leading them by an artificial channel to the nearest outlet, it is obvious that they will be prevented from overflowing or injuring the subjacent grounds; and on the mode of performing this the art of draining depends. In order to conduct the operation in the simplest and most efficacious manner, it is necessary to attend minutely to the relative situation of the lands, and to the nature, thickness, and arrangement of the strata which lie near the surface. These, which form either the reservoirs and conducting channels of the water, or the retarding obstacles to its progress, are very diversified in their distribution and the nature of their materials; and to acquire an adequate practical knowledge of their various forms and appearances, would seem at first sight a task requiring a long course of laborious study and careful investigation; but in this treatise Mr Johnstone has so fully elucidated the art in all its bearings, and applied it so perspicuously to almost every possible variety of soil and situation, as to enable every person of ordinary judgment, after a careful perusal of the work, to adapt the principles to any particular case which may occur in practice. This, to say the least, is a most invaluable property in any scientific work, and in this respect we do not recollect any other by which *this* is surpassed. The style is perspicuous, and well adapted to the elucidation of the subject; and the *twenty-five plates* which illustrate the volume, consisting of plans of the surface, and sections of the internal arrangement of the strata, and which have been drawn by the author from actual observation during his extensive practice of nearly *forty years*, are so simple and perspicuous, as in many cases almost to supersede the necessity of any explanation.

The application of the principles to the drainage of *spring-bogs* and morasses, which forms a prominent part of the treatise, is exceedingly clear and intelligible, and well worthy the attention of every person interested in that description of land. " From the favourable situation of bogs, their being often of great extent, and their giving interruption to the improvement and regular cultivation of many estates and farms, their drainage becomes an object of the first importance," (p. 11); and from the rich and fertile soils which they are capable of forming, they are generally found amply to repay the money judiciously expended on their improvement. " Many extensive tracts of ground of this description are at present lost to every useful purpose to which they might be converted, from the mistaken notion of those to whom they belong, that their nature is such as either to render them incapable of being drained, or that it is only possible at an expense greater than their value; but, however impracticable it may *appear*, by attention to the proper mode of doing it, their drainage may be easily effected, and at little expense," (p. 60.)—Bogs may be arranged into different classes, according to the manner in which the wetness finds its way to the surface; but as respects the mode of draining them, they must be considered under the same general head,—the only effectual mode of performing this being to intercept the passage of the water by the porous substrata from the more elevated contiguous grounds, by forming the drain of sufficient depth to reach such strata. The position of the principal drain must be varied according to the uniform or irregular appearance of the springs; and in such cases considerable discrimination is requisite to discover the *principal* springs—or those from which the other outlets are supplied—by intercepting which, the subjacent grounds will necessarily be laid dry with the least expense of labour; while, from want of attention to this fact, the work will remain only half performed. Of the best modes of accomplishing this, according to the different surface appearances and stratifications, the information is full and satisfactory; and the utility of using the auger, for reaching the porous stratum, along the line of the principal drain, is clearly demonstrated. The different modes of effecting the drainage of lands of this description, according to the *old* and *new* systems, is given in detail; and the immense superiority of the latter must appear very distinctly to every person who peruses the work, even on an inspection of the drawings.

The process of draining *hills* forms another interesting section of this treatise. "The sides or declivities of many hills," says Mr Johnstone, "are, owing to the irregular disposition of the component strata, covered with alternate portions of wet and dry ground. By the general appearance of the surface, and the variety of herbage which the different soils produce, according to their dryness, or the degrees of wetness which affect them, the internal strata, and manner in which they are disposed, may often be ascertained with such degree of certainty as to guide the direction of the proper drains, applicable to the nature of the wetness, without any internal investigation. The difficulty or facility with which such ground may be drained, depends entirely upon the position of the different strata of which the hill is formed; and upon the perpendicular, horizontal, or slanting inclination of the rock, or other body in which the water is contained, and out of which it issues," (p. 76.) The practical directions given for conducting the operation, according to the various circumstances and appearances which present themselves, are clear and minute; and the extract which follows will exhibit the system in a very curious and interesting point of view. "In some hills, the strata of which they are formed lie [illegible] gular, that it is possible to draw the water from either side on the same level; which in many cases would be of advantage, by draining the one side, and procuring water for the other; for there is often wet and swampy ground on the one side, while the other is too dry. This is owing to the retentive body of clay, which keeps up the water, not being disposed in a horizontal direction, but having a dip or depression a little more to one side than to the other, and from the dry side being overlapped by a covering of clay, by which the water is forced to issue at the open side; but when an outlet is made for it on the dry side, by means of a drain and boring, lower than that which it naturally has on the wet side, the course of the spring may be thereby diverted. The opposite side being porous and sandy, it becomes a reservoir for the rain-water, which will afterwards discharge itself at the artificial opening made on the other side—a circumstance that may be useful for domestic purposes, when a house is set down on the dry side of a hill," (p. 78.)

The facility with which the principles of the art may be applied to the *procuring of water for wells*, and other purposes of great utility, is also clearly demonstrated. The advantages to be derived from it in this respect must appear very obvious to every one acquainted with the subject, and with the many failures which have occurred, after expensive efforts, from ignorance of the proper data on which to found calculations. An instance of its practicability, and that water will rise to a very considerable height *by means of its own pressure* in high and distant ground, Mr Johnstone has given in the following occurrence, which happened in digging a well in the vicinity of London:—" Earl Spencer, for the preservation of his noble mansion at Wimbledon against fire, ordered a well to be dug at a little distance from the house, which was sunk to the amazing depth of 600 feet before any spring was found! It was begun on 31st May 1795; and on the 12th of August 1796, the man who was employed in the undertaking gave a signal to the person above to draw him up, as he had found the spring, and was immersed in water so deep that his life was endangered. In the space of *four hours* the water rose to the height of 350 feet, and during two days following its height was more than a foot an hour. The water, proceeding from rock, is remarkably fine, and, from the strata it passes through, is strongly impregnated with mineralic qualities. The sinking of this well alone cost his Lordship L.2000, but will recompense him by its utility; as, before it was done, the only supply for the family was either rain falling during the wet weather, or water procured from the adjoining fish-ponds. As there is no extent of higher ground near that where the well was sunk, and as the depth of it was some hundred feet below the bottom of the Thames, the source of the reservoir from whence the spring is supplied must be situated at a very great distance, and must contain a very large and permanent body of water, to raise it so suddenly to such a height, and continue to supply it."

The drainage of *holms*, or those level tracts of land so generally found along the margin of rivers, and which are very liable to be injured by a superabundance of moisture, from the oozing of water from the channel of the river through the alluvial matter of which their soil is composed, forms also a part of the treatise, the remarks upon which will be found valuable in practice.

A very interesting subordinate branch of this system is the practicability of its application to the relieving of *mines* and *quarries* from the subterraneous water which so frequently impedes their working. In the former of these, this interruption in some degree invariably occurs, and in many cases occasions a great expenditure of time and money in overcoming the obstacle it presents to the operations of the miner. In pits which are sunk perpendicularly to a considerable depth, engines of great power are often requisite to draw up the water which finds its way into them; and the expense of these, as well as the inconvenience occasioned by interruptions to their working, from accidents or derangement and wear of their parts, are in every case serious grievances, to lessen which must always be an object of mportance. This, as Mr Johnstone shews, may be partially accomplished by a proper attention to the drainage of the adjacent land, previous to the opening of the pit. The districts in which minerals are found being generally mountainous, afford great facility for drawing off the water which collects in their nterior porous strata, and which, when a shaft is sunk through these strata, naturally finds an outlet into it. It is evident, however, that the effect can only be partial; as pits that are sunk to a great depth must necessarily penetrate strata which are far removed from any connection with those near the surface, and consequently beyond the range of such operations, and in these lower strata wetness of a different kind will impede the working; but even the partial advantage which seems capable of being derived is such, as to merit the attention of those interested in mines being directed to the subject. The illustrations of this part of the subject are sufficiently lucid, and the directions for conducting the operation are given with much precision, which is indeed characteristic of the whole treatise.

The system of draining, the scientific principles of which we have briefly noticed above, and the development of which forms the most prominent object of this volume, originated with Mr Joseph Elkington, a farmer in Warwickshire. His attention being led, by an accidental circumstance, to the investigation of the internal passage of water, and the nature and disposition of the substrata, he attained such a correct knowledge of the subject, as to enable him to apply it successfully to the improvement of the art of draining, which, previous to that time (1764), was practised in a very random and inefficient manner. His first experiments were so completely successful, and the results so astonishing, that the public attention was speedily attracted to his operations; and in the year 1795, the Board of Agriculture, then recently instituted, obtained, through the exertions of its patriotic president Sir John Sinclair, Bart., whose efforts in the cause of agriculture have long been well known and highly appreciated, a parliamentary grant of L. 1000, as an inducement to Mr Elkington to discover the principles of his system. On the recommendation of the same worthy Baronet, the Board appointed Mr Johnstone to accompany Mr Elkington on a survey of his principal drainages in different counties of England, and to draw up a report of the principles on which they were founded, with practical details of their execution. The first edition of the work under notice, published in 1797, was the result of Mr Johnstone's mission; and of the ability with which that was executed, *two large editions* of the work, anterior to the present (the second in 1801), as well as the very general adoption of the system, afford satisfactory proof. On his return from visiting Mr Elkington, he commenced the practice of the system in

Scotland, where, as well as in the northern counties of England; he has been unremittingly and successfully engaged in its prosecution. The work having been long out of print, he has been induced to republish it; and his experience having been much extended since the appearance of former editions, the present has been revised and enriched with many valuable additions. It is the only complete systematic work on the subject of draining which has ever been published, and has furnished the substance of many smaller treatises on the art, to be found in encyclopædias and agricultural works, in which it is regarded as a standard authority. It was also translated into the Swedish language in 1801, and very favourably noticed by the Archbishop Von Rosenstein, in his Report to the Royal Nerician Society, of which he was secretary.

It is not, however, to the illustration of Elkington's system alone, that the division of the work appropriated to draining is confined. The various modes of *hollow* and *surface draining* in general, as practised in different parts of the kingdom, are also detailed at length. These are applicable to cases in which the wetness proceeds not from the water of springs, but from rain water stagnating on the surface, from the compact and impervious nature of the soil, and the want of declivity sufficient to carry it off. This, of course, requires a different mode of procedure; and in this department of the subject, much valuable practical information will be found for guiding the operations of the farmer. The most eligible modes of *forming* and *filling* drains, according to relative circumstances, are likewise explicitly pointed out; the *implements* best adapted for practical use, and the mode of using them, are described; and, in a word, the book contains a mass of valuable information on the art of draining, a considerable portion of which is not to be found in any other publication extant. To attempt fully to analyze it would exceed the limits of an ordinary article; and we must, therefore, refer our readers to Mr Johnstone's treatise, the perusal of which we can confidently recommend.

In the second division of the present treatise, on the subject of *Embanking*, there are also many new and valuable remarks; but from the length to which the above notice extends, we shall have room for but a very few additional extracts. The subject being intimately connected with that of draining, it forms an appropriate and important part of the volume, though it was not inserted in any of the former editions. It is arranged in a systematic manner; and the best modes of protecting and reclaiming land from the encroachments of the sea, of defending the banks of rivers and lakes against inundation, and of the formation of dams and wears, and of artificial pieces of water, are severally treated of in a scientific and practical way.

On the general importance of embankments it would be needless for us to make any remarks, as that must force itself upon the attention of every one who observes the devastations occasioned by large bodies of water. The practicability, however, of their efficient construction is, to the unskilful, in many situations less apparent; and instances are by no means rare of total and expensive failures, from ignorance of the true principles of their erection. These, as they are developed in the treatise before us, are plain and satisfactory; and from the author's professional experience, and extensive local knowledge, his observations and directions will be found highly useful, and worthy of careful perusal. While in the draining department of the work the mineralogist may discover much information of utility in his pursuits, the engineer will find in this many facts calculated to be of eminent service in this branch of his profession.

The observations on reclaiming land from the sea by embankment, are deserving of the serious consideration of those proprietors whose estates lie contiguous to the sea coast. Much valuable land has already been acquired in this way, and that much more may yet be gained at an expense leaving a large remunerating advantage, is an incontrovertible fact. It is principally a want of attention to the subject, and a deficiency of the necessary information, that prevents many landholders from perceiving its importance, and feeling that interest in it which it certainly merits. Of the achievements of Dutch enterprize and perseverance in this respect, few persons are ignorant; and to revert to these is sufficient to prove the practicability and advantage of effecting much more than has yet been done in Britain by such undertakings.

On the embanking of rivers to protect the adjoining lands from the regular and constant action of the current, and also from the ravages of inundations, Mr Johnstone's remarks will likewise be found highly valuable. Though this is a branch of the subject less difficult than the former, mistakes are very often committed in its execution; and much expense might in many instances be saved, by an acquaintance with the principles on which the work should be done. These consist in a careful attention to the nature of the soil; the proper form of the banks, or that which is best adapted to resist the force and action of the stream; and to the materials of which, according to circumstances, it should be composed, and which will serve as its defence. The observations on these points, in the course of the treatise, are sufficiently explicit, and the accompanying drawings will remove any difficulty in reducing the directions to practice.

In the conclusion of this part of the treatise, the author says, "The works that are erected both for use and for pleasure, in the construction of dam-dikes, and the formation of artificial ponds of water, are often faulty in the design, and expensive in the execution. The rules and directions for these have been suggested from observation in different parts of the kingdom, where the writer has had the opportunity of viewing and examining them, as well as from his own experience in planning and directing works of the same kind. Of sea-dikes and river embankments he has also, in the course of his profession, had the designing and direction. He has, therefore, with some degree of confidence, treated that part of the subject, and can safely recommend to the notice of those who may be desirous of undertaking such works, the various modes of execution that have been explained."

In an appropriate Appendix, Mr Johnstone has given "hints and directions for the culture and improvement of bogs, mosses, moors, and other unproductive ground, after being drained," and which are certainly not the least valuable part of the work. To the practical farmer, this is a subject of the highest interest, as "it is from waste lands, not hitherto *completely cultivated*, that the greatest profit can be made (when once brought into culture), rather than from land which has been long under the plough, not merely from the rent of such land being comparatively low, but, from all *new land*, *when improved*, yielding when properly managed, more profitable returns than can be obtained from those soils that have been long under cultivation. No object in nature can appear more unpropitious than an *undrained uninclosed* waste tract of ground, overrun with heath, rushes, and other useless plants, producing the most stinted herbage, and giving an appearance of sterility, even to the cultivated parts that may adjoin or surround it. Notwithstanding these unfavourable appearances, however, such land is in a greater or lesser degree, according to situation and climate, capable of improvement; and, when improved, rewards the cultivator in a tenfold degree," (p. 223.)

Surely such considerations as these, and their reality cannot be controverted, are sufficient to attract more attention to the subject of improvements, than it has, in a public point of view, hitherto received. There are yet in the three kingdoms, more especially in Ireland, many thousand acres lying waste, which, by pursuing a proper system, might be converted into productive land, and made subservient to ameliorating the condition of the labouring classes. This is evidently an object of higher importance than the growth and improvement of our foreign colonies, which, the sooner they attain maturity, will be more likely to become independent rivals; and it is therefore incumbent on the Legislature of the country to bestow more serious attention to the subject than they have ever done.

In taking leave of Mr Johnstone's Treatise, which our limits preclude our further noticing, we again earnestly recommend its perusal to our readers—convinced that it must prove beneficial to the practical agriculturist, to the lover of science, and to the landlord who feels interested in the improvement of his estate.

The author has recently announced that "he has it in contemplation to publish an essay, accompanied with a plan and geological sections of the country, from the Pentland Hills to the Frith of Forth, illustrative of the subterraneous passage of water from its highest feeders to its lowest outlet, forming a succession of bogs and swamps in the intervening hollows (though now drained, and at one time lakes), according to the nature and inclination of the substrata through which it passes, from its most distant receivers to its lowest outlet at the level of the sea. Having in his possession plans made by his father and himself, of most of the estates in the county of Edinburgh, he will be enabled to construct a more correct chart of the country, than what can be taken from any map or maps hitherto published, all of which are on too limited a scale for geological purposes; and by correct levelling and exploratory borings in the line of the different sections, the substrata, whether mineral or otherwise, as well as the passage of water, will be more correctly ascertained, and will be delineated, *coloured*, and described accordingly. This essay, with additional appropriate matter on the subject of draining, mining, and rural improvements, will form a second volume to the treatise now published."

From the increasing interest felt in every thing connected with geological research, we are convinced this will meet with the encouragement such an undertaking merits; and while we shall look forward with interest to its publication, we also hope its appearance may be the prelude and model to similar essays on a more extended scale, particularly in those districts of the country where mineral strata abound.

---

## ON THE APPLICATION OF THE POINTS BY WHICH LIVE-STOCK ARE JUDGED,—I. TO SHORT-HORNS.

By Mr JAMES DICKSON, Cattle-Dealer, Edinburgh.

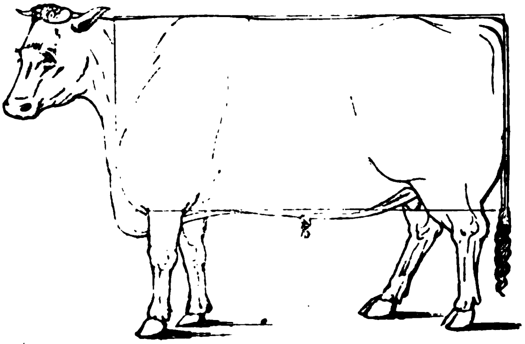
HAVING, in my former paper (vol. v. p. 159), enumerated the *points* and form by which the value of an ox of any breed ought to be ascertained, let us now apply them to the prevailing breeds of cattle, that we may thereby discover which is the most valuable one existing; and, after having ascertained that by comparison, we will then be prepared to consider whether the ess valuable breeds might not be improved by intermixture with the most valuable, or, at least, whether such attempt at rossing would be beneficial to the country.

Before proceeding with this interesting investigation, I may emark, that the points and form recommended for general application are neither imaginary nor arbitrary; on the contrary, hey have been discovered and established by long experience atiently acquired, and they have now received the general sanction of competent judges; in short, they form the rule of judgment for our best practical judges of cattle. It may have been observed, however, that I have hitherto applied the rule only to *oxen*, and it may therefore be very reasonably demanded whether it applies as well to heifers, bulls, and cows? To this I answer, that it applies to every age, sex, and condition of cattle, and that if it did not, it could not be maintained and recommended as a *general* rule; but in its application to bulls and cows there is a slight deviation occasioned by sexual development. In the bull, age produces an enlargement of the muscles of the neck, and a fulness of the gristle, and a consequent dependence under the brisket; these are marks of *virility*, beside others, which cannot exist in the ox; and in the cow, age produces a thinness in the buttocks and an enlargement of the abdomen, and a consequent depression of the loins; these being marks of *calf-bearing*, which cannot exist in the heifer. In all other respects in regard to general form, points, quality, and good breeding, the rule applies as strictly to the bull, the cow, and the heifer, as the ox.

Of the various prevailing breeds of cattle in Scotland which I shall enumerate and apply the rule of judgment to, I shall begin with the *Short-Horns*.

When we survey the frame of a short-horn ox, we have a straight level back from behind the horns to the top of the tail, full buttocks, and a projecting brisket; we have, in short, the rectangular form, as represented in a side view by this Fig. 1;

Fig. 1.



we have also the level loin across the hook bones, and the level top of the shoulder across the ox, and perpendicular lines down the hind and fore legs on both sides, these constituting the square form when the ox is viewed before and behind, as represented

Fig. 2.

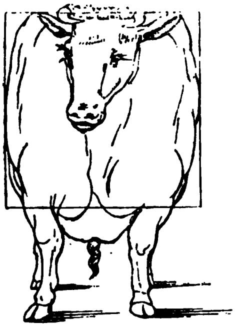
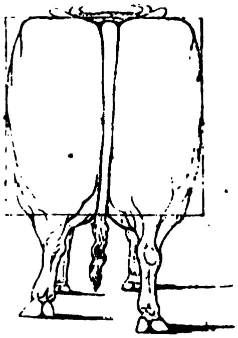
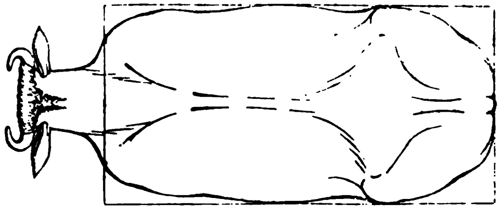


Fig. 3.



in Figs. 2 and 3; and we have straight parallel lines from the sides of the shoulders along the outmost points of the ribs to the sides of the hind quarters, and we have these lines connected at their ends by others of shorter and equal length, across the end of the rump and the top of the shoulder, thus constituting the rectangular form of the ox when viewed from above down upon the back, as represented by Fig. 4. We have in this manner

Fig. 4.



the form of the short-horn ox and heifer in perfect accordance with the diagrams of the rule.

Further, I should be inclined to assert, although I have not directed my attention to the fact sufficiently to be able to prove the assertion from examples, that the carcass of a full fed symmetrical short-horn ox included within the rectangle, is in length double its depth, and its depth equal to its breadth. Hence, Figs. 2 and 3 are squares, and Figs. 1 and 4 each two similar squares, placed in juxtaposition. The short-horn bull deviates from the rule in a rising of the neck, a dependence under the brisket, and a fulness of the neck vein; the cow only a little from the ox or heifer in a thinness in the buttocks, and besides this, when aged, in an enlargement of the belly, and mostly, though not always, in a hollowness in the loins. The *form*, therefore, of the short-horn breed is perfect according to the rule.

In its *points*, that for quantity and well laid on beef, the short horn ox is quite full in every valuable part, such as along the back, including the fore ribs, the sirloins and rumps, in the runners, flanks, buttocks, and twist, and in the neck and brisket as inferior parts. In regard to quality of beef, the fat bears a due and even preponderating proportion to the lean, the fibres of which are fine and well mixed, and even marbled with fat, and abundantly juicy. The fine, thin, clean bone of the legs and head, with the soft mellow touch of the skin, and the benign aspect of the eye, indicate in a remarkable degree the disposition to fatten; while the uniform colours of the skin, red or white, or both, commixed in various degrees,—bare cream-coloured skin on the nose and around the eyes, and fine tapering white or light-coloured horns,—mark distinctly the purity of the blood. These points of blood and quality and quantity of beef, apply equally to the bull, the cow, and the heifer, as to the ox. Combining all these properties of points and form, we shall find that the short-horn breed illustrates, in a very satisfactory manner, the application of the general rule which has been explained. On account of its valuable properties, this breed demands further illustration.

The external appearance of the short-horn breed is irresistibly attractive. The exquisitely symmetrical form of the body in every position, bedecked with a skin of the richest hues of red and the richest white, approaching to cream, or both colours, so arranged or commixed as to form a beautiful fleck or delicate roan, and possessed of the mellowest touch,—supported on small clean limbs, shewing, like those of the race-horse and the greyhound, the union of strength with fineness; and ornamented with a small lengthy tapering head, neatly set on a broad firm deep neck, and furnished with a small muzzle, wide nostrils, prominent "mildly beaming" eyes, thin large veiny ears set near the crown of the head, and protected in front with semi-circularly bent, white or brownish-coloured short (hence the name), smooth, pointed horns;—all these several parts combine to form a symmetrical harmony, which has never been surpassed in beauty and sweetness by any other species of the domesticated ox.

Enthusiastic as this language may be considered when applied to the external beauty of cattle, it is not more so than the beauty of cattle is entitled to; for when it is considered that symmetry of form generally accompanies mellowness of touch in the skin, and that both constitute the true index to a disposition to fatten, the most *useful* property of all, beauty of external appearance is too valuable a criterion to be overlooked. Fortunately, indeed, beauty cannot be overlooked in cattle, for, even were it useless, it is so irresistibly engaging, that the judgment of a stoic would be biassed in its favour. To my taste, nothing can be so attractive a spectacle of the kind as a show of fine bred short-horns in high condition, such as are to be seen at Dunse June Fair, Alnwick First Fair, or the monthly markets at Kelso and Coldstream in May and June.

As proofs of a disposition in short-horns to fatten, many facts might be adduced. The famous Durham ox of Mr Charles Collings of Barmpton was computed to weigh, at five years old in 1801, 168 stones imperial, and was purchased to exhibit, on the 14th May 1801, by Mr John Day, for L. 250. Mr Day could have sold him on that very day for L. 525, on the 13th June for L. 1000, and on the 8th July for L. 2000! He travelled him for six years, and after all that long confinement, and eight weeks of illness, the ox weighed when killed 165 stones 11 lb. the four quarters. In 1808, Mr Collings exhibited a four-year old white heifer, which was estimated to weigh 130 stones. In 1815, Mr Thomas Smith of Grindon had two five-year old oxen, which were computed to weigh 160 stones each. One of them (called Caps-all) was afterwards exhibited through a great part of Scotland and England. Mr Smith sold ten beautiful fat cows one year at Berwick June Fair, which had all slipped calf, for L. 32 a-piece, and which were computed to average 90 stones each.

Two very fine oxen, three years old, were shown by the late Mr John Rennie of Phantassie, at the Show of the Highland and Agricultural Society of Scotland in Edinburgh in 1827.

They obtained the first premium for the best pair of short-horn oxen, were supposed to weigh 110 stones, and 115 stones the four quarters, and were sold after the show at, I believe, L. 50 each.

The Spottiswoode ox, bred by Mr Spottiswoode of Spottiswoode in Berwickshire, was perhaps the largest ox that ever was exhibited. As I was at one time a little interested in this ox, I may be permitted to give his history. He was out of a country cow, by a short-horn bull, brought to Thornydyke by Mr Swan, from the neighbourhood of Morpeth. There was no particular notice taken of him till he was two years old, when he had outstripped all his companions on the ordinary food of the farm. During the two following summers he was kept by himself, with only a calf in a small park; and fed on turnips in winter. He was fully fed in the fifth and sixth years of his age, and, when rising seven, he was sold in June 1802 to my father and uncle, butchers in Dunse, for L. 210, including the value of the waggon which was made on purpose to exhibit him in. His dimensions at that time were:—height of the shoulder 6 feet 4 inches, length from nose to rump 12 feet 4 inches, girth behind the shoulder 10 feet 2 inches, breadth across the hooks 3 feet 1 inch; computed weight 320 stones, of 14 pounds to the stone. After being exhibited for about a year in the principal towns in Scotland, when a handsome profit was realized from him, he was sold to Messrs Johnston, Richardson, and Morrison, for 350 guineas. In the race week at Newcastle, in 1803, he drew L. 30 a-day. On his way through Durham 600 guineas were offered for him. He was subsequently shown in London and in all the principal towns in England. Falling lame, probably from long confinement, he was brought back to Scotland, and put into the Canonmills Distillery at Edinburgh, to be fed off, but refusing that kind of food, and probably feeling much pain from his increasing lameness, he fell off prodigiously in condition, which rendered it necessary to kill him.

But not to dwell only on examples of great weights at great ages, I may mention, that the late Mr Robertson of Ladykirk sold steers and heifers from 1814 to 1822, varying in age from three years and two months to four years and a half, whose four quarters produced from 90 stones to 135 stones of beef, and tallow from 15 stones to 26 stones each. Mr Robertson has often brought his fat cows to 100 stones each. Many farmers in Berwickshire and Northumberland bring their three-year old oxen to 80 stones or 90 stones. In a central part of Forfarshire, Mr Stephens, at Balmadies, sold in 1830 a five-year old short-horn cow which had slipped calf, and which gave milk for eighteen months. She was fed on turnips and straw from only November to April, when, being slaughtered by Mr Robert Small, Dundee, she produced 72 stones of beef the four quarters, and 23 stones 8 lb. of tallow. And even so far north as Kincardineshire, Captain Barclay Allardice of Ury can shew as heavy steers as any breeder, having realized L. 40 a-piece for three-year olds at his annual sales. All these weights were obtained by common feeding.

In a breed of cattle evincing a disposition to fatten, it is erroneous to suppose that this property is only obtainable by an extraordinary consumption of food at an unprofitable rate. I have heard this supposition frequently asserted as an undeniable truth by many farmers who were unacquainted with short-horns. Indeed, such a supposition can only have arisen from ignorance of the constitutional habits of that breed. It is well known to every feeder of cattle that every ox in the same lot does not feed alike; and to what does he attribute this difference in the capability of feeding, but that one ox is a "harder feeder," or, in other words, is more difficult to feed than another? He does not maintain that the hard feeder consumes *less* food than the kindly feeder, for he sees and knows the reverse to be fact; on the contrary, he allows that the difference of feeding arises from a difference in the "nature," or, in other words, the *disposition*, of the animal. He observes that a restless ferocious disposition not only prevents the possessor of it from feeding, but his companions also. It must therefore be allowed, that an ox of a kindly, will lay on more beef with the same quantity of food than one of an unruly and churlish, disposition, and hence it is more profitable to feed an ox of a kindly than of an opposite disposition. Still a difficulty may reasonably arise in the mind of one unacquainted with short-horns. He may acknowledge that an ox of gentle disposition may lay on more beef with the same quantity of food; but knowing the hardness of feeding exhibited by some kinds of cattle, that property of itself cannot convince him that it may not cause more food to be consumed than the larger quantity of beef obtained may be profitable. To one unacquainted with the disposition to fatten in short-horns, this difficulty in feeding may appear insurmountable. But experience would soon prove to him that short-horns not only possess disposition to fatten, but that they consume less and less food in *proportion as they attain weight and fatness*. Disposition to fatten, therefore, means not only the acquisition of more beef with the same quantity of food, but the diminished consumption of food in proportion to the weight of beef acquired.

The profit arising from feeding short-horns may be exhibited from a few instances. I have seen Mr Thomas Smith of Grindon, receive, at Whitsunbank Fair, for four-year old steers, L. 44 a-piece. The late Mr Robertson of Ladykirk has frequently received L. 35 a-piece for three-year olds. I remember in 1815, that he shewed, at the meeting of the Border Union Agricultural Society at Coldstream, two three-year old oxen, which were computed each to weigh 110 stones. Happening to be at Morpeth market a short time afterwards, I saw these two oxen, with six others, sold for L. 45 a-piece, and the two were resold before they left the market at sixty guineas a-piece. Mr John Rennie used to realize L. 40 a-piece for three-year old oxen, at the sales which annually took place at Phantassie. I have seen the late Mr George Brown, who was in Whitsome Hill, Berwickshire, in 1815, sell the whole cast of his beasts, twenty in number, at twenty-five guineas a-piece. Such prices cannot be considered unprofitable, or if they are, the rent of land must be exorbitantly high.

Disposition to fatten insures another valuable property—early maturity. This property is almost peculiar to short-horns. It is obvious that a disposition to fatten cannot develope itself till the ox is supplied with more food than will merely support life. Young cattle are frequently restricted to such quantity of food as will only support their growing condition. This practice probably had its origin in that period of husbandry when the raising of food for animals attracted little attention from the husbandman; and even after food became more plentiful, young cattle were restricted in its use, from a conviction, erroneously acquired, that only cattle of mature age could be fattened. This prevalent practice confirmed a habit of treatment which was extended even to short-horns till a very few years ago. It was a prevalent custom for breeders of short-horns to keep them till four, and sometimes five years old, before they were fed off. Now that the breed is improved and generally distributed, a more profitable system obtains. Three years is the longest period, and very frequently oxen are fed off at two years of age. I have frequently seen Mr Robertson have two and a half year old steers sold for L. 26 a-piece, and brought to a weight of 72 stones each. The late Mr Abraham Wilson of Edington Mains, used to bring two-year olds to 80 stones, and sold them at L. 28 a-piece. Mr John Rennie of Phantassie often exhibited two-year olds at 80 stones each, and realized L. 30 a-piece for them. At the great sales of stock which took place at Phantassie, Mr Rennie always realized L. 30 a-piece for two-year olds.

These instances prove very satisfactorily, that two-year old short-horns can be made fit for the butcher; but of course, in accomplishing this object, proper management is requisite. To shew what good management can accomplish, I may mention that I have seen breeders of short-horns, who farmed fine turnip land, but could never obtain more than L. 10 or L. 12 for two-year olds, while their neighbours, on inferior soil, obtained L. 20 for cattle of the same age; and yet in the former case, as much food had been consumed as in the latter. By improper management, the advantages to be derived from the largest portion of the food are sacrificed. But many breeders, eminent as first-rate farmers, have no desire to sell their cattle till they have attained the age of three years. At this age they will easily attain 70 stones, or 75 stones, and a few to 80 stones. Such a system is pursued by Mr Smith of Shedlaw, Mr Wilson of Preston, near Dunse, and some others, such as the late Mr Hogarth of Bailieknow, near Kelso. They all produce first-rate three-year olds. I am of opinion, however, that the two-year old system is more profitable. The object of all farming is profit, and that can best be obtained by supplying cattle with more food, and keeping them a shorter time on the farm than three-year olds generally are, provided they can be brought to *maturity* at an earlier age.

I have already shewn that short-horns can be brought to maturity at two years old. Let us suppose a case to illustrate my position. Suppose that a breeder dispose of twenty fat three-year olds every year, he will in that case require to winter sixty head of cattle;—twenty on full feeding, twenty one-year olds and twenty two-year olds, on half feeding. Instead of this arrangement, suppose the breeder kept thirty one-year olds, and thirty two-year olds, which were annually fed off. My position is, that this latter arrangement will realize more profit than the former. For, suppose the twenty three-year olds attain 70 stones weight each, which, at 6s. per stone, gives L. 21 for each ox, or L. 420 for the twenty. On the other hand, suppose the thirty two-year olds attain 50 stones each, at 6s. per stone, they would give L. 15 each, or L. 450 in all; shewing L. 30, or more than 7 per cent., *additional* of profit. Another important consideration in this argument is, that the risk of loss of life on sixty head of cattle, is considerably less over two than over three years; and I have heard the annual average loss of cattle throughout the country rated as high as 3 per cent.. This sort of calculation will apply to a small or a large farm. The supposed weights of 70 stones for three-year, and of 50 stones for two-year olds, appear to be fair averages for ordinary years on most farms; and 6s. per stone may also be taken as a fair average price for beef at Morpeth since the war, and it is the regulating market for prices in the north of England. The feeding off at two years old, is a system which is fast gaining ground in the country; and as it makes a quick return for capital, which is a desirable result in times when profits are low, it should induce every one to bring up all their cattle, which are intended to be disposed of, at the feeding pitch from the period of birth.

Besides being of early maturity, short-horns yield beef of fine quality. It is the opinion of many breeders, particularly of black coloured cattle, that a four or five year old Scotch ox carries finer quality of beef, which fetches a higher price per stone than a young ox. If both the oxen are equally ripe, the difference in the quality of the beef is not discernible; and a well fed two-year old short-horn heifer will fetch as much per stone at Morpeth market, if not more, for cutting up, than any aged ox. This preference to heifer beef holds in other markets in the north of England, as at Darlington, York, Skipton, and Wakefield. The reason for this preference is obvious,—there is scarcely any coarse beef in short-horn heifers; they carry most of it on their backs, and other most valuable parts; on all those parts, in short, which yield roasting rather than boiling beef. Roasting and steak beef will fetch in every market a higher price than boiling beef. I have seen lots of steers and heifers bred and fed together, and when brought to market, the heifers, although four or five stones lighter than the steers, would fetch a higher price per stone, on account of their finer quality, which is always held in high estimation. In other parts of England, however, heifer beef is not preferred to ox. In Smithfield, for instance, a prime Scotch ox, either Galloway or West Highland, or any other breed, if he carry beef on the best parts, such as ribs, rumps, and sirloins, will obtain the highest price of the market. Carcass or wholesale butchers in London, buy oxen to cut up to suit their respective customers. Retail butchers, and tavern and eating-house keepers, who are their customers, buy roasting and steak beef, from the rumps, sirloins, fine ribs, and thick flanks, and will pay for it from 4s. 8d. to 5s. per Smithfield stone of 8 lb. Buttocks, thin flanks, middle ribs, shoulders, and briskets, though profitable for family use, do not fetch more than 3s. 4d. or 3s. 8d. per stone; while all the coarse parts, such as the houghs, clods, and stickings, will not realize more than 1s. 8d. or 2s. per stone. It is difficult to account for the predilection for ox beef in one part of the kingdom, and for heifer beef in another. It is well, however, for the promiscuous dealer and breeder, that large markets exist for both; and they should remember that *only* the *best* quality of beef, whether of heifer or of ox, fetches the *highest* price.

Whilst considering the subject of the quality of beef, I cannot too earnestly press upon the breeder the necessity of breeding cattle only with fine points. These alone carry beef of the finest quality, and these alone realize the largest profit. Every breeder in Scotland, whether he *fatten* his cattle or not, should treat them as if all heifers were to be sent to Morpeth, and all oxen to Smithfield, the largest market for cattle, as every body knows, in the world. To Smithfield market! What have *we* to do with Smithfield? exclaims a Scotch breeder. Smithfield is every thing to you. It is the great mart for consumption in the country; should you not find a suitable market for your well fed oxen, upon which you have bestowed much trouble, and which you cannot afford to part with at a small price, you have steam-ships ready at the nearest large shipping port to take them to Smithfield. But should you have no *fat* cattle to dispose of, and dislike the trouble of sending them to a distant market at your own risk, still you have a strong interest in Smithfield market through your *lean* cattle. As thus:—Cattle are generally purchased by dealers in the northern counties from breeders, in small quantities; and are driven south to the Falkirk Trysts, or other markets, to meet other dealers who purchase them, already selected in lots, to drive still farther south to markets in England. There they are again purchased by feeders or graziers, who either sell them at home to dealers who take them to Smithfield, or consign them direct to a Smithfield salesman. Of course, those cattle of the finest quality, and shewing the greatest proportion of beef on the fine points, obtain the highest price, and their worth is duly appreciated by every dealer through whose hands they may happen to pass.

As one example will give a better illustration than many arguments, I shall instance the practice of a celebrated dealer in north country black cattle, Mr Charles Macomie in Aberdeenshire, to illustrate the mode of dealing in cattle in Scotland. When such extensive dealers as Mr Macomie go to a country market with the intention to purchase, they select cattle with a view of suiting their customers, who they know will purchase them according to their respective tastes; and as they may have finer or coarser keep for them. They select four or five from one lot, six or eight from another, and so on, till they make up a lot of perhaps fifty, or, it may be, a hundred cattle, all well selected, matched, and having the appearance of being bred by the same person. They make up several such lots of cattle of different characters to suit different customers. These they take to Falkirk, where they are purchased by south country dealers, who have a view of disposing of them to particular dealers or graziers in England, and take or consign them to Smithfield after they are fattened. Such selected lots of cattle will insure pleasure, if not profit too, to every one through whose hands they pass. The salesman in London is proud in having such to dispose of. The carcass butcher thinks himself fortunate in having fallen in with a fine lot. The hotel, tavern, and eating-house keepers, are pleased with their purchase of prime rumps and sirloins; while the epicure chuckles with delight over his savoury roast or steak.

Every breeder should therefore be careful to cultivate good points in his cattle, and always steadily keep in view that they may one day or another appear at the greatest market in the world, where their worth will be duly appreciated; and even although they should never reach Smithfield, the possibility of the beef which he has bred and fed being served up on the table of his Majesty, looking invitingly in the dining-hall of the nobleman, or gracing the hospitable board of the Lord Mayor, ought to stimulate every breeder to the production of an article which would be worthy of being so honourably preferred. We may depend upon it, that the caterers for these high dignitaries will only select the finest quality of beef, irrespective of the condition of the individual, be it humble or otherwise, who had cherished, or of the more humble shed which had sheltered, the object of their choice. Such customers are able and willing to pay a good price for good beef. Nay, lean cattle of fine quality will always command a market when those of inferior quality cannot be turned to money at any price; and even small cattle, if of superior quality, will obtain a higher price per stone than large coarse animals.

I was once present at an amusing altercation between five men who were appointed judges of cattle at an agricultural show. Three were in favour of one short-horn bull, and two of another. The favourite bull of the three was a much larger animal than the other, but shewed inferior points as to quality of beef. One of the two asked the other three "Whether roasting or boiling beef was worth most money per pound?" Two remained silent, but the third answered, he was "not aware of the difference in that part of the country," which was north of the Frith of Forth. "Then," rejoined the one of the two, "roasting beef sells from a penny halfpenny to twopence a pound more in London than boiling beef from the same animal." The spokesman of the three deprecated any reference to London practice. He was immediately replied to, that "breeders had a very strong interest in the English market, for four-fifths of the cattle bred in

Scotland are driven into England and consumed there, and therefore they ought to study to supply what was suited to the English market, and that was fine quality of beef. The large bull with coarse points," he added, "was only fit to get cattle suitable to his Majesty's ships, whereas the other could get them fit for his Majesty's table." In this remark it is not to be understood that I acquiesce in the opinion, that *inferior* quality of beef is good enough with which to provision his Majesty's navy. Far from it. Every gallant defender of his country deserves to share the best produce which his country can supply. But it is well known that cattle cannot be too large for shipping, as large grained beef stands the salt better on long voyages, whereas size is no object when fine quality is only desired.

Disposition to fatten and early maturity are the only means by which profit, both to the feeder and the butcher, can be insured. This proposition may not be self-evident, because, as has been already demonstrated, that if these properties are the results of fine bone, small head, and compact form, little offal will be left to the butcher for his profit, whatever the carcass may be to the feeder. In these respects the butchers' profit on short-horns are no doubt small; but as a compensation for the diminished value of the less useful parts, nature has caused these same properties to secrete an increased supply of valuable fat or tallow in the interior of the animal. And thus, short-horns, when ripe, at whatever age, "die well." The instances which I have already related of the quantity of tallow yielded by the large oxen, cows, and heifers, varying from twelve stones to twenty-six stones each, indicate the source of profit to the butcher which exists in the interior of the animals of this breed. The tallow alone would be, in most cases, a sufficient profit to the butcher. These instances of from twelve stones to twenty-six stones of tallow are certainly extraordinary, but even in ordinary cases of six or eight stones, the value of the tallow more than compensates for the small value of the rest of the offals.

Natural docility of temper, which the short-horns possess in a remarkable degree, renders their disposition to fatten more effective. A good tempered animal receives all the benefits to be derived from the food which he consumes. This is very apparent in feeding oxen. But the bulls even are gentle, and never become mischievous, excepting under particular provocation; and the cows, and heifers, and calves, can be approached for any purpose at all times, in the field and in the house.

It would be an interesting investigation to ascertain how the short-horns have been enabled to originate, maintain, and extend apace the celebrity which they have so long enjoyed. I fear such an investigation cannot be pursued with much satisfaction, for the origin of this breed, like all other existing breeds of cattle, is enveloped in obscurity. All that we know of the mode of maintaining the proved good qualities of any domesticated breed is to preserve the *purity* of its *blood;* but what is understood by purity of blood, and how it can be preserved in practical breeding, is more easily conceived than defined by breeders. In practical language, *purity* of *blood* means freedom from an immediate intermixture between different varieties of cattle; and it is preserved in practice in the highest degree by the union of selected males and females, free from that immediate intermixture and close relationship. Blood, in the sense used by breeders, does not mean mere consanguinity in animals of the same kind, for breeds of animals exist which shew no symptoms of purity of blood; but it denotes the exercise of those superior influences which improve the external characters, and give a refined tone to the useful properties of animals. The external characters of animals are described from the form, bone, colour of the horns (if any), and structure of the head. The useful properties originate in the improvement of the external characters. Hence, the *points* form the true index to them. The useful properties, however, must acquire permanency before they can exhibit a refined tone. The refined tone constitutes the "high blood," or "high breeding," as it is commonly called, and it acquires its greatest vigour or bloom when *all* the useful properties arrive at the greatest degree of perfection. Animals thus made perfect attain the highest degree of domestication,—the state in which they yield the greatest profit to man. This high tone, however, may be too much refined, it may lose its bloom, and exhibit symptoms of decay. When it declines, that is, when the points become coarse or obliterated, the external characters undergo great and rapid mutation; and the useful properties dwindle into worthlessness. The good points disappear, and bad ones substitute themselves in their stead. The refined tone may thus be regarded as the pendulum of the domesticated animal economy, the altered oscillations of which indicate the approach to, or recession from, the acme of the point of perfection in domesticated animals. This refinement can only be observed in domesticated animals. The external characters of wild animals are always permanent, but they may or may not possess the useful properties desired by man. Those which do possess them might be usefully domesticated, and their utility rendered permanent by the acquisition of a refined tone or " blood." The power of practically exercising those influences which improve the external characters, and give a refined tone to the useful properties, has evidently been conferred by Providence on man, to enable him to domesticate animals, by rendering these properties eminently useful to him.

As an illustration of permanent external character being differently impressed by nature and domestication, I may instance the two opposite cases of the urus and the wild horse. The urus possesses few or perhaps none of the useful properties to man of the domesticated bull and cow, though its external characters are quite permanent. The wild horse of the Savannahs of South America and the Steppes of Tartary, possesses all the useful properties of the domesticated horse, and has retained them, though he is not, like the urus, strictly a wild animal, for he is the descendant of the domesticated horse let loose, and possesses, in most particulars, the properties of the blood horse of Arabia and England. Were our domesticated cattle let loose, it is as probable their descendants would retain the useful properties as permanently as the wild horse now does. The horse of Arabia is a domesticated animal, and his " high blood" can be traced back to antiquity, where it eludes our research. In like manner, the " high blood" of our short-horn cattle may one day be traced back to antiquity by our posterity.

If my view of the characteristics of blood in the domesticated animals be correct, then other races of animals than the blood-horse possess " blood," or are " high-bred." True, it is not the same tone which pervades different races of domesticated animals. The difference in blood is exhibited by a difference in the refinement of the tone, owing probably to the idiosyncrasy of the race; and each race which shews "blood" or "breeding," has a refined tone correspondent with *its* permanent useful properties. The refined tone of the race-horse stallion corresponds with the external characters and useful properties of his race; and that of the short-horn bull corresponds with the external characters and useful properties of his race. The refined tone of the cart mare is in accordance with the external characters and useful properties of her kind; and that of the Leicester ewe is in accordance with the external characters and useful properties of her kind. Distinct races of domesticated animals have therefore distinct traces of refined tone, or "blood," or "breeding."

I have said that the origin of short-horn cattle, like all other existing breeds of cattle in this country, is but obscurely known; that is, in other words, the origin of that breed which imparted the external characters and useful properties of the short-horns, is but obscurely known; but the period at which that breed began to acquire the refined tone, or "blood," which now characterizes its useful properties, is not enveloped in obscurity. Historians trace the type in this manner: A race of cattle had long existed on the banks of the Tees, in the counties of Durham and York. Whence or how they came is not known. They acquired the appropriate title of Teeswater cattle. Many years ago this breed existed in considerable numbers; the following description of which is given by the Rev. Henry Berry, in his Account of the Improved Short-horns, p. 13, 14.

"In colour resembling what is called the improved breed of the present day, except that the fashionable roan was not quite so prevalent; they are described in general characters also to have differed very little from their descendants. Possessing a fine mellow touch, good hair, light offal, particularly wide carcasses, and deep fore-quarters; they were also justly celebrated for extraordinary proof when slaughtered,—resembling thus closely their descendants of the present day. One trifling difference is alone worth recording,—the horns of the old Teeswater breed were rather longer, and turned gaily upwards."

The Teeswater breed thus formed the foundation on which the present superstructure of the improved short-horns have been reared. The connecting link, however, betwixt the old and new breeds cannot now be very distinctly traced, the history of that connexion being very unsatisfactory. Whether any attempts had been made to improve the Teeswater breed itself is not known. Every authority on this subject seems to agree, that the first probable attempt to improve them was by crossing with a breed imported from Holland, which was similar to that now in Holstein. Certain it is that the present Dutch and Holstein breeds of cattle present a frame not unlike that of the improved short-horns, and superior to that of the Teeswater, though in *points* they are inferior to the former. The colours of the Dutch are black and white, while those of the Teeswater were red and white. The numerical superiority of the latter breed may have obliterated the black colour of the former; but it is not improbable, that the black of the imported breed had rendered the red of the Teeswater darker and richer. The red colour of any unimproved breed of cattle that I have seen, is generally of a yellower hue than the rich red of the improved short-horns. These remarks on the colour of cattle are by no means whimsical, for colour is a permanent character, and the uniform intensity of colour, of whatever tint, is strongly indicative of purity of blood. Short-horns only sport two colours, a rich red and a cream white. These may be exhibited singly, or they may be patched together, or blended hair about. The presence of any other colour should be viewed with great suspicion.

Amongst the earliest importers of Dutch bulls and cows was Sir William St Quintin of Scampston. The cross produced by the imported breed is said to have made a decided improvement on the old; and following up the advantage, the cross at length produced a stock distinguished by the name of the "Teeswater Short-horns," a stock which united in a wonderful degree the good properties of graziers and milkers. These valuable properties were soon appreciated, and cherished with uncommon zeal among rival breeders. Mr Milbank of Barningham was one of the most successful of these breeders. He flourished about ninety years ago.

No pedigrees of cattle having been kept at that early period of their history, no satisfactory account of them can be given till the appearance of the bull Studley, of a red and white colour, bred by Mr Sharter of Chilton. How he was directly descended I cannot ascertain; but there is little doubt of his being the result of the cross, though not an immediate one, between the old Teeswater and Dutch breeds. It is probable that Mr Sharter may have obtained the dam or sire of Studley from Mr Milbank, for he was in the practice of purchasing stock from the latter gentleman, who was particularly fortunate in his stock of cattle. A cow which was bred from Mr Milbank's stock by Mr Sharter was slaughtered, after bearing several calves, and weighed in the four quarters upwards of 110 stones. And to shew the successful completion of Mr Milbank's improvements in his own days, an ox, five years old, was slaughtered by him, and the four quarters weighed 150 stones. The Studley bull, then, may be regarded as the first *recorded* progenitor of the present race of improved short-horns. He is described "as having possessed great girth, deep fore-quarters, short legs, neat form, and light offal." His pedigree, however, is not traced in Coates's Herd Book. The Studley bull, red and white, got James's Masterman's bull, which was bred by Mr Walker, near Leyburn. Masterman's bull, colour not known, got William Robson's bull, which was bred by Mr Waistell of Great Burdon, near Darlington, and whose dam was Mr Waistell's roan cow Barforth. Robson's bull, colour unknown, got Snowdon's bull. Mr George Snowdon of Hurworth, received a present of six cows and a bull from his landlord Sir James Pennyman, who obtained his stock from Sir William St Quintin of Scampston; but whether the present given to Mr Snowdon by his landlord, consisted of the Dutch breed as imported by Sir William St Quintin, or the improved cross with the old Teeswater, appears to me uncertain. Be that as it may, Snowdon's bull got the famed bull Hubback, colour yellow-red and white, bred by Mr John Hunter of Hurworth, and calved in 1777. Hubback's dam was also bred by Mr Hunter, and she was got by a bull of Mr Banks of Hurworth; and his grand-dam was bought from Mr Stephenson of Ketton. It was at one time asserted that Hubback's dam was descended from a Kyloe, but there is every reason to believe, from the testimony of people who knew Mr Hunter's stock, that she was descended from the stock imported from Holland. Hubback, when a calf, was about to be purchased by Mr Waistell, who refused to give the money sought for him, namely, L. 8. Mr Waistell asked the opinion of Mr Robert Collings of Hubback, who expressed it in a manner which induced Mr Waistell to close the bargain. Mr Robert Collings also desired to purchase the young bull, so that both these gentlemen made a joint speculation of him. Both parties not being overjoyed with their purchase, sold him to Mr Charles Collings of Barmpton, near Darlington, who soon saw the value of the little animal. For quality of flesh, hide, and hair, young Hubback could not be surpassed. Hubback's mother, when removed to good pasture, got so fat as to be unable to breed, and Hubback himself soon became useless as a bull; but so long as he could be used, he proved himself a sure stock getter. Mr Waistell repented of selling Hubback to Mr Charles Collings, for "when he began to cover, Mr Charles Collings confined him to his own stock, and would not let him serve even one of Mr Waistell's cows."[*]

Beyond this period it is quite unnecessary to trace the pedigree of short-horns. "It has been remarked," says a writer, "that we have at present no superior horse on the turf, which does not boast the blood of the Godolphin Arabian" (by-the-by the Godolphin was not an Arabian, as is commonly stated, but a Barb), "so it may be asserted that we have no superior short-horns which do not claim descent nearly or remotely from Hubback." Foljambe's dam was got by Hubback. Foljambe, white and a few red spots, calved in 1787, was the bull Mr Charles Collings considered did the greatest good to his stock; and in him were the Barningham and Hubback bloods united. Mr Charles Collings, by great judgment and perseverance, brought the short-horns to the greatest degree of perfection. It is rare that a man enjoys the fruits of his own labours, in a business which, in a great measure, he had created for himself, and which requires the greater part of a lifetime to bring to maturity; but in Mr Charles Collings's case, it may be said, he was amply rewarded for his attention to breeding. His brother Robert went hand in hand with him, and participated in his success.

Take the following as an instance of their success. According to Mr Bailey's Survey of Durham, Mr Charles Collings's stock realized the following prices on 11th October 1810:—

---

[*] British Cattle, p. 229.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 17 cows, | for | L.2802 | 9 | 0 | highest price | 410 | guineas. |
| 11 bulls, . | ... | 2361 | 9 | 0 | ...... | 1000 | ... |
| 7 bull calves, | ... | 687 | 15 | 0 | ...... | 170 | ... |
| 7 heifers, | ... | 942 | 18 | 0 | ...... | 206 | ... |
| 5 heifer calves, | ... | 321 | 6 | 0 | ...... | 106 | ... |
| 47 head sold for . | | L.7115 | 17 | 0 | | | |

At that sale was sold the bull Comet, calved in 1804, and died in 1815, to Messrs Wottend, Trotter, Wright, and Charge, near Darlington, for 1000 guineas, and it is said that 1600 guineas were offered for him afterwards.

On the 29th of September 1818, Mr Robert Collings's stock was sold off at the following prices:—

| | | | | | | |
|---|---|---|---|---|---|---|
| 34 cows, . | for | 4141 | guineas; | highest price | 370 | guineas. |
| 17 heifers, | ... | 1287 | ... | ...... | 331 | ... |
| 6 bulls, | ... | 1343 | ... | ...... | 621 | ... |
| 4 bull calves, | ... | 713 | ... | ...... | 270 | ... |
| 61 head sold for . | | 7484 | guineas. | | | |

Till within the last thirty years, few short-horns were seen north of the Tweed; but now, the counties of Berwick, Roxburgh, and the northern portion of Northumberland, can exhibit as numerous and high bred stock as the counties of Durham and York. Amongst the breeders of short-horns in Scotland, the late Mr Robertson of Ladykirk, near Coldstream, stood pre-eminent. Mr Robertson spared neither trouble nor expense in procuring the best bulls from the most eminent breeders in England. His judgment of good stock was very acute. He furnished accommodation to stock, both in regard to housing and pasturage, of the first order. It was a delightful sight to contemplate his stock of cows, forty in number, grazing in the luxuriant old pastures around Ladykirk House. I have seen the grass as high as their fetlocks by the middle of April. It was also delightful to see the feeding stock in winter, in small comfortable hemmels, bedded plentifully with straw, and supplied with abundance of turnips. During the early period of his exertion in breeding stock, Mr Robertson was averse to strangers inspecting his premises, and few breeders were permitted to send cows to Ladykirk. Latterly, however, when the stock was as highly bred as any as could be obtained from England, he was more liberal in the disposal and use of his stock. His bulls Signior, Sirius, white, Sultan, roan, Young Sultan, Valentine, red, Romulus, white, which all proved themselves excellent stock getters, will not soon be forgotten. During the last few years of his life, Mr Robertson evidently relaxed in his exertions to preserve his stock in the highest perfection. They shewed evident symptoms of too close breeding; they became tender, and wanted size; and accordingly, at the sale at Ladykirk after his death, the breeding stock did not realize the prices they were entitled to according to the breeder's fame. The Messrs Comptons of Carham, in Northumberland, became eminent breeders. At the sale at Carham, some of the bulls fetched upwards of L. 100, and the cows L. 60. Mr Thomas Smith of Grindon, also in Northumberland, some years ago possessed a very superior stock. His stock was generally of a larger bone than Mr Robertson's, carried great weights, and were very hardy in constitution. Mr Smith's heifers were eagerly sought after by breeders. His bull Duke, and some others which were never named, left much good stock. Of late years Mr Smith has declined the trouble of an active breeder. His brother, Mr William Smith of Shedlaw, possessed an equally good and similar sort of stock. The stock of the Messrs Smith was mostly red and white, while that of Mr Robertson were mostly white and roan. Still keeping on the south side of the Tweed, Mr Alexander Thomson of Scramerston and Learmonth, has bred many superior bulls, such as Young Lancaster, Learmonth, Midas, Mindrum, North Star. Mr John Grey, Milfield Hill, near Wooler, has a large breeding stock. The bull Fitz-Duke was bred by him. Mr William Jobson, Chillingham-Newton; Mr Robert Jobson at Turvielaws; Mr Hunt at Thornington; Mr Alder at Hazlerigg; Mr Currie, who was at Brandon; Mr Culley of Akeld, who soon declined farming, but whose stock fetched a large sum; Mr Culley of Fowbray; and Mr James Chrisp at Doddington, are all eminent breeders; and the blood of their stock is so pure, that a breeder desirous of obtaining a good stock to commence with, or of crossing for improvement of what he may at present possess, cannot err in selecting from any of them.

On the north of the Tweed Mr Robertson of Ladykirk took the lead as a breeder of short-horns. His stock was neat and compact, and possessed properties very similar to that of Mr Charles Collings'. No farmer could well compete with Mr Robertson, for no farmer had the fine old pasture and accommodation equal to the lawn and steading of Ladykirk. It was pleasing to observe a large landed proprietor devoting these favourable advantages, and his time and talents, to the cultivation of stock. Mr John Heriot of Ladykirk Farm being near to, and on intimate terms with, his landlord Mr Robertson, possesses the same stock. The late Mr Abraham Wilson of Edington Mains, near Dunse, had a fine and large breeding stock; he and three other gentlemen hired the bull Diamond from Mr Charles Collings, which obtained at the time the first premium at the show of the Tweedside Agricultural Association. His late brother Mr James Wilson, and his nephew Mr John Wilson, at present at Simprim, near Coldstream, possessed fine useful breeding stock. Few better stock could be seen anywhere than at Whitsome Hill, near Dunse, when the late Mr George Brown had that farm. In his stock was united the Grindon and Ladykirk bloods. He bought heifers from Mr Smith, which were served with Mr Robertson's bulls; a privilege which none but Mr Heriot possessed, beside Mr Brown. Mr Robertson was so pleased to observe Mr Brown's superior farming, that he offered him gratuitously the service of his best bulls. Mr Jopling of Castlelaw, near Coldstream, has a fine breeding stock. The late Mr Hogarth of Bailieknow, near Kelso, was long an eminent breeder, and purchased some of Mr Robertson's best bulls. The short-horns have so spread over the Border counties of Scotland, that every farmer, how small soever his possession, has now stock of a superior order. The show of the very superior stock at the Highland Society's Show at Kelso in 1832, demonstrated in a decisive manner the superior quality of this species of stock in the Borders.

In East Lothian, which is not a breeding county, the Marquis of Tweeddale, at Yester, and Mr Bogue of Linplum, have devoted much attention to the breeding of short-horns. But the most enterprising breeder in this county was Mr John Rennie, when at Linton. He did more than any ot erson to *spread* fine stock throughout Scotland. He purc l all the finest breeding and feeding stock he could find, and posed of them every year, by public auction, at Phantassie. At these sales, L. 22,000 have been received in one day. He purchased largely from the stocks of Mr Robertson and Mr Mason of Chilton. His very superb lot of breeding cows, as they grazed in the fine grass park in front of Phantassie House, was the admiration of every one who passed that way.

The Duke of Buccleuch has a superior stock at Dalkeith Palace. His Grace purchases the finest heifers and bulls that can be had in England, his principal object being to stimulate his tenantry to the like exertion.

In Fife General Simson led the way. He obtained most of his stock from the Messrs Collings, and although they were all sold off at the General's death, they remain in the county to disseminate the breed. Mr Boswell of Balmuto bestowed great attention to breeding short-horns. Part of his stock was obtained from Northumberland. Having removed from Balmuto to Kingcausie, near Aberdeen, he there pursues the crossing system with the short-horn bull and Aberdeenshire cow. Mr Thomson of Pusk, and Mr Dudgeon of Falkland Wood, with some others, have tried the short-horns; but this breed, though well adapted to Fife, is not so widely dispersed in it as they deserve, much to the loss of the farmers themselves.

Mr Mowbray of Cambus, a distiller in Clackmannanshire, is very spirited breeder of short-horns, and makes every exertion to spread the breed through the county. He shewed some superior stock at the Highland Society's Show at Stirling in 1833. Mr Ritchie of Newhouse, near Alloa, purchased the white bull Romulus, bred by Mr Robertson, from Mr Rennie, and which obtained the first premium, in 1827, at one of the Highland Society's Shows at Edinburgh. Mr Aitchison, of St Clement's Wells, another distiller, purchased some good animals from Mr Rennie's stock.

The short-horns are pushing their way through Perthshire Mr Richmond of Monedie has shewn some good specimens of them. Lord Kinnaird at Rossie Priory has purchased bulls from the present Earl Spencer for the use of his tenants. Mr James Hunter of Monorgan, in the Carse of Gowrie, has paid considerable attention to the breed; and, not far from him, Mr Patrick Kinnear of Lochton and Littleton has shewn good specimens of stock. These gentlemen, and Mr Hunter of Glencarse, purchased the red and white bull Linton from Mr Rennie.

In Forfarshire the short-horns first took footing near Coupar-Angus. Mr David Inches of Cardean has shewn many excellent specimens. He derived his stock from the Messrs Wilson of Edington Mains and Simprim, in Berwickshire. Mr Andrew Dalgairns of Ingliston, a very extensive feeder, has now got a considerable number of them; and so have his neighbours Mr Anderson of Newton and Mr Hood of Hatton. Mr Stephens late of Balmadies was among the first to introduce short-horns in the eastern district of Forfarshire. His stock was obtained from Mr Brown of Whitsome Hill, in Berwickshire; and his red and white bull, named Brown in honour of the breeder, was admired by every one who saw him, having proved himself for eight years an excellent and sure stock getter. He was got by Mr Robertson's red and white bull Valentine, out of a cow descended from the stock of Mr Mason of Chilton, and crossed with the stock of Mr Smith of Grindon. At the sale of Mr Stephens' stock in 1830, Mr Rennie of Kinblethmont Farm, Mr Hood of Hatton, Mr Cobb of Mains, were purchasers as breeders. Mr James Rennie of Kinblethmont Farm, near Arbroath, followed Mr Stephens' example, and has now a large breeding stock. Mr William Mustard of Fithies, who is a famous breeder of Angus cattle, also tried the short-horns, as well as his brother Mr James Mustard of Leuchlands, near Brechin. The late Mr Arkley of Dunninald, near Montrose, had also a large breeding stock of short-horns at an early date. He obtained them principally from Mr Mason of Chilton. The stock was sold after his death and distributed through the county. Mr William Cobb of Mains, near Dundee, has some good short-horns; and the late Mr Anderson of Carlungie, near Arbroath, possessed some good stock.

In Kincardineshire, Mr Taylor of Kirtonhill kept a stock of short-horns. He latterly declined farming, but part of the stock still remains with the present farmer, who took his farm. But Captain Barclay Allardice of Ury has excelled all other breeders of short-horns to the north of the Frith of Forth. He purchased many bulls from Mr John Rennie and others, and [illegible] now shew as high bred and good skinned stock, and of as strong a constitution, as any breeder. His success may convince any one that short-horns will thrive admirably in Scotland, and will pay better than any other stock. Captain Barclay has a stock of thirty cows, the produce of which he sells annually as breeding stock, which realize good prices; and he ships fine heavy steers by steam to London. He has proved himself one of the most spirited breeders and farmers in Scotland.

The late show of the Highland Society in Aberdeen in 1834, where sixteen short-horn bulls were shewn, proves the wide dissemination of the breed, even in that northern latitude. They have also found their way to the county of Caithness, whither the late Mr Thomson of Laws and Mr John Wilson of Simprim, in Berwickshire, have sent bulls to Mr Horne of Stirkoke.

This hasty enumeration, for I could not run the risk of tiring the patience of my readers by entering into the particulars of every breeder's stock, shews how the short-horns are spreading themselves over the face of the country. Such an important result could only have occurred from a conviction of the superior properties of this breed; for, perhaps, no breed of cattle has had to encounter in so great a degree unmerited obloquy, and dogged prejudice, as it has had north of the Forth. Let any man who is well acquainted with the profitable properties of short-horns recommend them to a north country farmer, and he will be instantly met with this plausible but disparaging remark, " They may be very well adapted to your fine climate in the south country, but they could not thrive here on our poor meat, like our own black cattle." To attempt to prove the fallacy of this assertion, for it is nothing else, by an appeal to facts established by the experience of south country breeders, would be of no avail, for dogmatic assertion overrules every argument. But now that the experiment of breeding them has been tried before their very faces, in their own country, and alongside their own favourite breeds; and that it has been proved beyond contradiction that they will get fatter on the same keep, and will endure quite well the ordinary climate of the plains in Scotland, dogmatists dare not now be so bold. Strange that so much proof is requisite to convince men to enhance their own interest, by adopting that breed which, under similar circumstances, would leave them the larger profit. No doubt, short-horns require adequate food and requisite attention; but what superior thing can be obtained without corresponding trouble? I can say, however, that I have seen short-horns bred and fed on all sorts of land, and sometimes in high districts, and indifferent climate, and have known them do well in all situations. Nay, some of the farmers in high districts in the south of Scotland, where they are now kept, not unfrequently beat their neighbours in competition, who are in lower situations and finer climate. In any situation, two-year olds will fetch from L. 15 to L. 20 a-piece, and three-year olds from L. 20 to L. 25. Can such prices be obtained in the northern counties for any other breed of cattle? And if not, why require farther inducement to cultivate the more profitable breed of the short-horns? Nor are such prices obtained through extravagant feeding. Only the ordinary produce of the farm, such as grass, turnips, straw, and potatoes are given; and unless hay is very cheap and abundant, it is never applied to the feeding of cattle. But as L. 20 a-piece for two-year olds is a large return, one-half of which time the cattle may be said to be calves, the short-horns would pay even for extraordinary feeding. The truth is, cattle ought to be kept at a feeding pace throughout the whole time the breeder has them in his possession. It is both loss of time and labour, and a great risk of life, to keep cattle hanging on in a mere growing condition. The sooner they are brought to maturity the sooner is the return of capital effected, the larger the profit realized, and the less risk of life incurred. In the ordinary circumstances of life, a person would feel obliged by being made acquainted with advantageous means of obtaining profit; but in the breeding and feeding of cattle some stronger inducements, it seems, must be superadded!

The rage for breeding short-horns has been much encouraged by the institution of agricultural societies for the distribution of high premiums to successful competitors. Two such societies were formed many years ago on the Borders, one, The Tweedside Agricultural Society, which held its meetings twice a-year at Coldstream; the other, The Border Agricultural Association, which met as frequently at Kelso. Every nobleman, gentleman and farmer in the districts around contributed to the support of these societies. At length an amicable union of interests was made by them under the title of the Border Union Agricultural Association, which meets alternately at Coldstream and Kelso. L. 100 are annually given for the best five bulls, and an exhibition of forty bulls for competition is no uncommon sight at these shows. Some years ago the breeders south of the Tweed used to carry off most of the prizes; but now the breeders north of that celebrated river, draw off their fair share of prizes, shewing the progressive improvement in this branch of agricultural industry. Breeders in Scotland have now greater reason than ever to drink " Both sides of the Tweed." Similar societies exist in the counties of East Lothian, Fife, Perth, Angus, Kincardine, and Aberdeen, by whom the encouragement of short-horn stock is laudably and perseveringly kept in view. But all these local societies are mere auxiliaries in their exertions to the Highland and Agricultural Society of Scotland, a society which now enrols, as members, 2000 of the most influential noblemen and gentlemen, and the most experienced farmers, in the country, and which possesses the means of distributing upwards of L. 2200 a-year in premiums for the promotion of agriculture. The Highland Society, mindful of local improvements, bestows a portion of its premiums, in conjunction with local societies, for the improvement of the best breeds of cattle and sheep throughout the country. In magnitude and influence no such society ever existed before in any country. It is a society worthy of the high character which Scottish agriculture has acquired throughout the world.

The preservation of the valuable breed of short-horns is a consideration of paramount importance; and, fortunately, it is in the power of breeders themselves to secure it. It consists entirely in maintaining the *purity of blood in vigour*. This desirable end is best secured by avoiding, on the one hand, the evil of breeding in-and-in, that is, the union of too close relationship in blood, and, on the other, too violent a cross. A strong mark of the purity of blood being in vigour is the circumstance of like producing its like; and no breed will in this respect incur so little disappointment to the breeder as short-horns, after a proper selection of the dam and sire.

The evil of breeding in-and-in, or, in other words, producing too great refinement of tone, is manifested in the first instance by a tenderness of constitution; the animals not being able to withstand the extremes of heat and cold, rain and drought. If the evil is prolonged through several generations, the forms of the animals become affected, the bone becomes very small, the neck droops, the skin of the head becomes tight and scantily covered with hair, the expression of the eye indicates extreme sensibility, the hair on the body becomes thin and short, and the skin as thin as paper; the *points* continue good, and predisposition to fatness increases, but the whole carcass becomes much diminished in size, though retaining its plumpness and beautiful symmetry. The evil, however, does not terminate in the production of these symptoms. Internal diseases ensue, such as disorganization of the liver, or rot, polypi in the trachea, or clyers, malformaton of the bones of the neck and legs, and general deformity.

A remarkable instance of the evils of breeding in-and-in may have been observed in Mr Robertson's stock during his latter days, when he relinquished the active duties of a breeder. A decline in the constitution might have been observed in the white bull Romulus, bred by Mr Robertson, and shewn by Mr John Rennie at the Highland Society Show in Edinburgh in 1827. He exhibited evident symptoms of delicacy, and was in very poor condition, owing most probably to having caught cold some time before the show. The judges, nevertheless, awarded him the first prize, because he was decidedly the bull which shewed the purest blood on the ground. In this award they displayed right judgment, and proved they were judges in the best acceptation of the term. The bull certainly did not at the time shew to the best advantage. Few would have supposed he was from Mr Robertson's celebrated stock, or had been brought up on the fine pastures of Ladykirk. Still as he was, he shewed superior *points* of high breeding to any bull that was exhibited against him. He was the finest toucher I ever put my hands on. Afterwards, when recovered from the cold, he shewed himself a very superior animal in appearan When full of beef, it was difficult to find a bull with so ny fine *points.* Many people censured the decision of the ju solely [illegible] account of the low condition of the animal, and of his small size; and this opinion was well touched off in a very humorous manner by the Shepherd, in the Noctes in Blackwood's Magazine for April 1828. After all, it was evident his constitution had become tender by too near breeding, for although afterwards he regained condition, he died of consumption in the hands of Mr Ritchie, the gentleman formerly alluded to, who bought him. Viewing the decision of the judges in this light, it is questionable whether they should not rather have selected a bull for the premium of hardier constitution, of which there were several in the show.

It is true that both Mr Bakewell and the Messrs Collins bred much in-and-in. Such a practice may be excusable in those who are attempting to establish a particular kind of stock, as by that means it will be sooner brought to maturity. But the same licence cannot with propriety be taken by breeders who have abundance of well-bred stock within their reach from which to select their breeding stock. The invariably injurious tendency of breeding in-and-in proves that Nature herself places a barrier against abuse in breeding.

The practice of breeding in-and-in leads me to remark on the subject of judging of large and small bulls. I have had frequent opportunities of observing that premiums, at local shows, are given by the judges to *large* bulls. This I conceive a great mistake. In my opinion, the size of a bull ought to be considered of secondary importance in judging of him as a breeding animal. That which shews the greatest number of good *points* ought to be chosen, and these should be counted by the judges. One bull may possess one point better than another; but that one possessing the greatest number of points ought to be preferred, particularly among a competition of aged bulls. Some young bulls, it is true, do not shew their points till they are one, or even two years old, whilst others shew them from the first. When all the points are not visible on a young bull, he must be partly judged of by his pedigree. If the blood is well descended, free from intermixture, and not too nearly related in blood on both sides, then a young bull may be safely judged of by his pedigree. The points of well-bred young bulls improve as they advance in years. I recollect of a remark which was made by an eminent breeder of short-horns, the late Mr Abraham Wilson of Edington Mains, in Berwickshire, in regard to this very subject. He once had a yearling bull, which shewed rather indifferently as to points, and was dissuaded to breed from him. He remarked, that knowing his blood, he should breed from him, though he were as crooked as an Z. He did so, and obtained some most excellent stock from him, and the bull improved very much in his points as he advanced in years.

Purity of blood, then, being the criterion by which to judge of bulls, the size is a matter of little importance. Fine quality is of greater value than size. Short legs are generally indicative of fine quality; and it seldom happens that large size is united with fine quality. Where the two properties are found to be united, I should certainly prefer the large size; but without knowing the pedigree, a mistake is more likely to be committed by using a large than a small bull. The stock of the most celebrated breeders consisted of bulls of small size. Mr Robertson's bulls were small, and so were those of the Messrs Collings. In particular, Mr Charles Collings's bull Diamond, which obtained the first prize at the show at Coldstream, and was purchased by Mr Abraham Wilson and three others, for 150 guineas, was a small animal; but he possessed the most beautiful symmetry and points of any bull I ever saw. He was, in fact, a perfect model of a short-horn bull. His stock was very like himself. A great many of them are still in Berwickshire, and are very much admired. They get soon ripe, and never fail to fetch the highest price per stone in the market, the beef being of the finest quality. I have known two-year olds got by this bull fetch L. 25 to slaughter. I was the more assured of the propriety of attending to quality more than to size, by what I witnessed at Smithfield. On getting acquainted with one of the principal salesmen, who was a very frank man, I was desirous to obtain as much information from him as possible regarding the state of the market. He stated to me at the first this startling proposition, that " twenty stones of beef were not worth 20s., hat day." This appeared to me a strange remark, a perfect, conundrum, and I begged an explanation. That day's market, he explained, was short of fine quality, but was well supplied with inferior beef. For an ox of 80 stones, 8 lb. to the stone, of fine quality, he could obtain L. 20, whereas for one of 100 stones, of inferior quality, he could procure no more; so that twenty stones of beef were that day given away for nothing. These remarks reminded me of the propriety of the breeding toast, in reference to Smithfield, " Small in size and great in value." The bull Comet was rather a short-legged animal, but he had beautiful symmetry, exquisite points, and great substance. He was a bull of the finest quality.

The selection of bulls for breeding should not be made at random. Purity of blood is of course the first consideration. Every breeder should be able to trace the pedigree of his stock, and should keep a book for the express purpose of entering his stock as they are bred, in the manner that breeders of race-horses do. With such a reference young bulls, which do not shew all their points, might be bought and sold in perfect and mutual confidence. Quality of flesh is the next consideration. This property is generally, though not invariably, associated with a small size, and particularly with a shortness of the legs. Quality and blood, however, being the same, I would always prefer a large bull. Where these properties are not very apparent, or only one, not both present, the small size will incur the lesser risk of breeding from impure blood. A good touch is a very desirable point for early maturity. Some bulls shew many good points, but want the fine touch. This was the case with the bull bred by Mr John Rennie, and shewn by Mr Somerville at the Highland Society's show in Edinburgh, at the same time with Romulus. His defects were in not having fine touch, and having thin hair. A thick soft covering of hair is an excellent property in a bull. It enables the stock to withstand the vicissitudes of the season in any situation. At one time thin silky skins were the vogue, but breeders afterwards found that a good covering of hair protects the animals from many dangers of climate and disease. At the same show I exhibited the red bull Pizarro, bred by Mr Hunt of Thornington, in Northumberland, of the best coat of hair I ever saw on a short-horn, and having a rather thick, but mellow hide. The coat was like dreadnought, and the hair being set on thick, like down, it was impossible for cold or rain to penetrate it. This bull had been previously hired for two years by Mr James

Wilson of Simprim, in Berwickshire. Mr Wilson had another bull at the same time, with quite a different kind of coat. The calves of both were kept together, and though both were equally well bred, those got by the red bull with the thick coat stood out in the straw yard in stormy weather, and eat the turnips quite heartily; whereas the calves of the other could not. This bull obtained a premium at Kelso, and another at Haddington, beating Mr Somerville's bull, then in possession of Mr Bogue of Linplum. I sold the bull Pizarro to Mr Beattie of Oakwood, Selkirkshire, who used him for seven years, and who has obtained much hardy good stock from him. A heifer, his full sister, also gained a sweepstakes at Kelso. A lot of young heifers, which Captain Barclay disposed of, by auction, at Edinburgh, in autumn 1834, possessed fine thick coats, judiciously suitable to the climate of Scotland. Breeders of short-horns in Scotland should keep this point particularly in view in selecting their breeding stock, whether male or female.

All the considerations enumerated are particularly suitable to breeders who keep their stock to fatten, and especially for early maturity. To breed for the grazier is to pursue a somewhat different object. Graziers generally prefer cattle which stand high on the legs. They conceive they look better in a crowded or large market. Although, as a grazier, I would always prefer to purchase short-legged compact animals for feeding, still that is not the general rule with graziers. Butchers, on the other hand, look only to quality, especially in Smithfield, regardless of the length or shortness of the legs; but fine quality is more frequently associated with short than with long legs.

In judging of cows I should make some modification of the ules recommended for bulls. They should be always large, aving capacious parts to support the calf to a large size, and to dmit its egress freely at the period of calving. Purity of blood, f course, must be attended to as the first consideration; but, order to obtain a well-bred large cow to breed from, I would erlook a point or two in the symmetry or quality. As in the e with bulls, small cows will generally shew finest symmetry, I would deviate a little on the score of points, which are ry thing to a bull, to obtain a large capacious cow, which generally carries a strong healthy calf.

It has been frequently asserted, that short-horn cows are bad milkers, indeed that no kind of cattle are so deficient in milk. Those who say so do not know the still greater deficiencies of the Herefords, a species of cattle quite unknown in Scotland. The higher bred stocks of the Messrs Collings, Mr Mason, and Mr Robertson, yielded little milk. Indeed, Mr Robertson's cows could not supply milk sufficient for their own calves, at least not in the quantity which it was desired by him they should receive. Cows were kept for the purpose of supplying the deficiency of milk of the high-bred cows. But this deficiency of milk did not altogether proceed from the circumstance of the cows being of the short-horn breed; because those eminent breeders devoted their whole attention to the development of flesh, and not at all to the development of milk. Had the flesh been neglected as much as the milk, and the property of giving milk as much cherished as the development of flesh, their short-horn cows would have been deep milkers. As it is, the generality of short-horn cows are not bad milkers. Indeed, it is not to be doubted, that where the general secreting powers of the animal system have been increased, as it has been in that of the short-horns, the power of secreting milk will be increased with the power of secreting flesh and fat; all that seems requisite, is to encourage the power of that secretion, which for the time is most wanted. I have no doubt that it is completely in the power of the breeders of short-horns to make them good milkers. It would be to desire an impossibility, to desire the full development of flesh, fat, and milk, at the same time; but there is no absurdity in desiring a large secretion of flesh and fat at one time, and a large secretion of milk at another, from the same cow. Accordingly, this is the very character which has been acquired by short-horn cows. They will yield from six to sixteen quarts a-day throughout the season; and they are so constant milkers, that they seldom remain dry above six weeks or two months before the time of calving. I know a Scotch breeder who had a short-horn cow which gave fifteen quarts a-day during the flush of the grass in summer, and never went dry for two seasons. An attempt was made to dry her about six weeks before the period of calving, but it was thought that the udder would be injured to force it to get dry, when there was evidently no effort on the part of nature to effect it. In this manner she continued to give milk for two years, till she calved the second year, at which time the udder was attacked with inflammation, and she died. Many instances of very constant milking, in short-horn cows, have come under my notice.

But the practice of the owners of public dairies in towns, were there no other proof, would prove the milking powers of short-horn cows. They prefer them as the greatest and most steady milkers; and it is now difficult to see cows of any breeds but short-horns, or crosses with them, in these dairies. In London, Edinburgh, and Liverpool, fine short-horn cows may be seen at the public dairies. They are bought by the milkmen whenever they come of age, that is, about five or six years old. They give milk till they attain the age of eight or nine, and are then fed off fat for the butcher. These cows *can* be fed off fat. This property, and that of milking, prove clearly, that short-horns possess both in a remarkable degree. They do not, it is true, possess both in an eminent degree at the *same time;* but they exhibit either property separately when it is desired. They thus give a return in flesh for part of their original high price, whilst they remunerate their owners in the mean time with an abundance of milk for their food.

Short-horn calves are seldom fed for the butcher; but when they are, they exhibit in a remarkable degree the disposition to early maturity. Their docile temper inspires confidence in man, and secures them exemption from ill treatment. They take their food with avidity at any time it is offered them, while they lie at ease and in contentment till the period of feeding again arrives. In this manner they gain condition without trouble to hemselves or their owners, till in about eight weeks they will acquire the weight of 40 lb. per quarter. The celerity of acquiring flesh and fat in short-horns, is strikingly exemplified in he calf. Suppose a calf weighs 12 lb. per quarter when calved, n eight weeks it will acquire 112 lb., or one stone of 14 lb. per week; and when it attains to 80 stones in two years, it acquires on the average three quarters of a stone per week. But short-horns will lay on a stone per week even in the second year.

Thus at all ages short-horn cattle will realize a handsome profit, for the great care and good food liberally bestowed on them

## MISCELLANEOUS NOTICES.

I. *The Mode by which London is supplied with Strawberries.*—The supplying of a large city with some of even trivial luxuries, is often a curious operation, and of great importance to a number of persons, to whom it affords employment and subsistence. There are not many of the inhabitants of London, who do not every summer partake of the delicious strawberries with which it is so abundantly and so cheaply supplied. Yet few of them, when they have before them a small portion of that fruit, are aware that some hundreds of persons derive their livelihood during the time they are in season, from the various operations which the supplying London with them occasions. It may not, therefore, be uninteresting to take a view of the mode in which that city is supplied with strawberries. Most of the strawberries consumed in the metropolis are grown within ten miles of it, and by far the greatest number of strawberry-gardens are on its western side. The chief places at which they are situated are Isleworth, Brentford, Ealing, Hammersmith, Fulham, Deptford, Mortlake, Hackney, and Camberwell. The extent of land cultivated for strawberries has been much increased within a few years, and has been estimated at more than a thousand acres for the supply of London alone. The greatest number of persons who derive employment in producing strawberries for the markets are females, with the exception of those who dress the ground on which they grow. In the season in which strawberries are ripe, which is usually the end of May, the women who gather the fruit assemble in the strawberry garden, in the morning, as soon as it is light, which at that time of year is between three and four o'clock, and commence plucking the fruit. The best fruit, which is gathered earliest in the morning, is taken to the packing-room and carefully put in pottle baskets; fifty or sixty of these are placed in a large basket, and before seven o'clock in the morning, a number of women are despatched to the metropolis, each with one of these larger baskets, which she carries on the top of her head, with only a small cushion to make the pressure of the weight equal over the upper surface of the head. The weight of the baskets and fruit is from thirty to forty pounds, and sometimes even more. A party of these carriers then set off with their burdens, walking at a quick pace, and occasionally running, so that they generally accomplish five miles in an hour during their journey. And it is pleasing to observe with what skill and address, from habit, they manage their head-loads, (as they are called,) seldom having occasion to hold them with their hands. The burden being placed at the top of the head, makes it necessary for the carriers to keep a very upright posture in walking, so much so, that young persons, in higher ranks of life, have been corrected of a bad habit of stooping, by being made to walk with a small weight on their heads, without being allowed to touch it with their hands, in imitation of these poor women. When men occasionally carry the fruit, they have a shoulder-knot, similar to those used by porters, so that part of the weight rests on the shoulder, and part on the head, but by this mode of conveyance the fruit is more generally injured than when carried by women. The carriers arrive at the principal fruiterers in London early enough for their customers to be supplied with fruit gathered the same morning. The same women sometimes proceed with a second load to London, even when the strawberry-ground is situated seven or eight miles from the fruiterers. The employment of females as carriers of fruit, is within the last three or four years greatly diminished, by some of the largest strawberry growers having established a light kind of cars, hung on very pliable springs, like those used for coaches, and drawn by a quick-paced horse; one of these cars carries about twenty baskets, each of which would be a load for a woman. Though this mode is a considerable saving of expense, yet it does not convey the fruit in such perfection as when carried on the head. The fruit not sent by these two methods, is conveyed in carts with springs, during the night, to London, for the early markets, which commence at daybreak, and is sold wholesale by the gardeners, to the various retailers of fruit.—Connected with the supplying of strawberries to the metropolis, is a very ingenious manufacture, that of pottle-baskets; these are made by women and children. The women prepare the wood by steeping it in water, and splitting it, according to the parts of the basket it is designed to form. Then the most skilful arrange the slips of wood, which form the upright supports of the basket, and fix them in their place by weaving the bottom part; the sides are woven by children with pliable strips of wood, and the top is bound over by the more accustomed workwomen. If any of our readers will take the pains to examine one of these baskets, they will feel surprised that it has passed through several hands in making, and the wood been purchased and prepared, and yet that it is still supplied to the gardener at the rate of about sixpence the dozen. The baskets are formed of the wood of the fir or willow tree, the latter is the best. The manufacture of them is carried on by the poor at their own homes, in the towns near the strawberry-gardens, particularly at Brentford.—The women employed in gathering and conveying strawberries to London, cannot be estimated at less, during the time they are in season, than two thousand persons. Part of these are the inhabitants of the adjacent towns, but a great number of them are young women who migrate annually from Worcestershire, Shropshire, and Wales, and after the strawberries, raspberries, currants, and gooseberries are passed, return to the country in time to assist at the harvest, having usually, during their migration, saved enough to buy a good stock of clothes, and to lay by some money towards their support during the following winter. They are, in general, very industrious, neat, and well conducted in their behaviour.—*Saturday Magazine*, No. 124.

II. *The Coal Trade of Newcastle and Sunderland.*—The number of working collieries on the river Tyne in the year 1829 was forty-one; on the north side twenty-three, and on the south side eighteen. On the river Wear, six on the north, and twelve on the south side, making eighteen; the whole number on both sides being fifty-nine. The collieries on the Tyne are capable of raising double their present quantity of coals with the same machinery, but not with the same number of men. Those on the Wear are capable of raising one-half more. The reason why those collieries do not work to their full extent, is, that there is not a sufficient market to take off the quantity of coals that could be so raised. A much greater proportion of superior coals comes from the collieries on the Wear, than from those on the Tyne. Within the preceding fifteen years, the number of collieries on the Wear has increased, and collieries of larger power have come into action during that time. Several new collieries have also been opened on the Tyne, whilst on the Tees there has been a considerable increase in the export of coals. In some cases, the coal which is obtained from the pit is about 90 per cent.; and, according to the present improved system of working the mines, all the coal, or nearly all, is got out of the earth; that which remains behind being scarcely worth mentioning. There are collieries in the North which have cost from ten or twelve thousand to one hundred and fifty thousand pounds in sinking the pits, the establishment of machinery, and every thing requisite for putting the coal on board the craft, whether into keels or barges, or into ships. This sum includes railways, waggons, and machinery. Collieries are usually worked by adventurers. On the Tyne there are only five proprietors, out of the forty-one collieries on that river, who work their own mines; on the Wear there are only three; all the rest are in the hands of lessees, or adventurers. The aggregate money-capital employed by the coal-owners on the river Tyne amounts to about a million and a half, exclusive of the craft in the river. Some of these persons are owners of the craft, but many hire keels or barges. The money-capital employed on the Wear is estimated at from six to seven hundred thousand pounds. The wages of the colliers, if they could have full employment, are ample; but there is not full employment for them: fourteen shillings a-week is their lowest wages; but they could earn five shillings per day, if they had work to enable them to do so. There are a great number of well-meaning persons who have expressed great anxiety, arising from an apprehension that the time was rapidly approaching when the coal-mines of England would be exhausted, and that future generations would be deprived of the solace and comfort of a good coal-fire. In order to allay this natural anxiety, the following estimate of the extent and produce of the coal-mines of two counties in England only, and the proportion excavated, is given on the authority of Mr Hugh Taylor, colliery agent to the Duke of Northumberland. This estimate does not include the coal-fields of Yorkshire, Cumberland, Lancashire, Staffordshire, Warwickshire, Monmouthshire, Gloucestershire, Somersetshire, or Wales.

| | |
|---|---|
| *The Durham Coal-field.*—From South Shields southward to Castle Eden, 21 miles; thence westward to West Auckland, 32 miles; north-east from West Auckland to Eltringham, 33 miles; and thence to Shields, 22 miles; being an extent or area of square miles . | 594 |
| *Northumberland Coal-field.*—From Shields north 27 miles, by an average breadth of 9 miles, being . . . . . . . . . . | 243 |
| Total square miles, . . . | 837 |

*Portion Excavated.*—In Durham, on the Tyne, say 39 square miles; on the Wear 40 square miles—making 79 square miles. In Northumberland, say thirteen miles by two, equal to twenty-six square miles; making the total excavated in those two counties to be 105 square miles. Thus leaving 732 square miles of coal in the counties of Durham and Northumberland only, yet to be excavated. Estimating the workable coal strata at an average thickness of twelve feet, the solid contents of one square mile will be 12,390,000 tons; and of 732 square miles, 9,069,480,000 tons. Deduct one-third for loss by small coal, interceptions by dikes, and other interruptions, 3,023,160,000; there remains 6,046,320,000 tons; a quantity adequate to supply the present vend from Newcastle, Sunderland, Hartley, Blythe, and Stockton, of 3,500,000 tons annually for a period of 1727 years. There is also a considerable extent of coal-field in the northern and southern districts of Northumberland; but the foregoing comprises that which is continuous, and most suitable and available for exportation. The number of persons employed under ground in the works on the Tyne are,—Men, 4937; Boys, 3554; together 8491. Above ground—Men, 2745; Boys, 718. Making together, 3463; which, added to the number employed under ground, will make a total of 11,954; which, in round numbers, may be called 12,000. In the works on the river Wear there are 9000 men and boys employed; which, with the 12,000 employed in the works on the Tyne, make the number engaged in digging and raising coal, and delivering it to the ships on the two rivers, to be 21,000. From the best calculations it would appear, that averaging the coasting vessels that carry coals to the size of 220 London chaldrons each vessel, there would be 1400 vessels employed, which would require 15,000 seamen and boys to navigate them.

*Summary*—1400 Ships of 220 London chaldrons.

| | |
|---|---|
| Navigated by seamen, | 15,000 |
| Pitmen, and people employed above ground, | 21,000 |
| Keelmen, coal boatmen, casters and trimmers, | 2000 |
| Making the total number of persons employed in the Coal Trade on the rivers Tyne and Wear, | 38,000 |

This enumeration does not include returns from Blythe, Hartley, or Stockton, or from Scotland, but is strictly confined to the coal works on the rivers Tyne and Wear. In the year 1827, according to the Custom-House returns, there were 607 collier-ships belonging to the port of Sunderland, the tonnage of which amounted to 102,454 tons; and the number of ships that cleared out in that year with coals was 7518. The town of Sunderland is principally, if not entirely, supported by the coal trade; and there are variety of manufactures of different descriptions dependent upon it. The quantity of coals exported to foreign countries from Sunderland, on an average of four years, was 34,000 London chaldrons, and those sent coastwise 1,050,000 London chaldrons. The collieries on the Tyne and Wear are subject to various accidents; more especially those which supply the best coals. The principal catastrophes to which they are subject are explosions, creeps, and drowning by water. One of the difficulties in sinking a shaft is that of passing through quicksands; another is the immense quantities of water which are met with in the cavernous parts of the stratification, generally within forty or fifty fathoms of the surface, which is always dammed back by what is called a "tub," or, more properly speaking, a cast-iron caisson. Mr Buddle, in his evidence before the House of Lords, on the coal trade, states that he sunk a shaft which required forty fathoms of cast-iron tubbing. At forty fathoms the strata became perfectly impervious to water. One of the accidents to which collieries is liable is the breaking of this caisson, which has frequently happened, the water then rushing down into the mine below and drowning it; thereby occasioning a suspension of the works, and very great expense, till the tub could be repaired, and the water drawn off. A double-power pumping engine is then used, and there is then one shaft for the purpose of pumping the water out, and another drawing the coal. Pits of 170 fathoms deep are subject to this drowning. The quantity of coal worked depends upon the quantity required for the market; but the proportion between the quantity worked and the quantity sold has been thus calculated:—Taking 700,000 as the whole quantity worked, then 300,000 of that quantity is exported to London and elsewhere; 100,000 is consumed by the collieries, and sold from the pits, for land sale and home consumption; and 100,000 is wasted. The quantity of coals consumed in England and Wales is calculated as follows:—In manufactories, 3,500,000 London chaldrons; in household consumption, 5,500,000; making 9,000,000 London chaldrons consumed from inland collieries. The quantity sent coastwise on both sides of the island is 3,000,000 chaldrons, making twelve millons in all.

III. *The City of Dort, in Holland, preserved by Milkmaids.*—During the wars in the Low Countries, the Spaniards intended to besiege the city of Dort, in Holland, and accordingly planted some thousands of soldiers in ambush, to be ready for the attack when opportunity might offer. On the confines of the city lived a rich farmer, who kept a number of cows in his grounds, to furnish the city with butter and milk. His milkmaids, at this time, coming to milk their cows, saw under the hedges the soldiers lying in ambush, but seemed to take no notice; and having milked their cows, went away singing merrily. On coming to their master's house they told him what they had seen; who, astonished at the relation, took one of the maids with him to a burgomaster at Dort, who immediately sent a spy to ascertain the truth of the story. Finding the report correct, he began to prepare for safety, and instantly sent to the States, who ordered soldiers into the city, and commanded the river to be let in by a certain sluice, which would instantly lay that part of the country under water where the besiegers lay in ambush. This was forthwith done, and a great number of the Spaniards were drowned; the rest, being disappointed in their design, escaped, and the town was thus providentially saved. The States, to commemorate the memory of the merry milkmaids' good service to the country, ordered the farmer a large revenue as a recompense to him for the loss of his house, land, and cattle; and caused the coin of the city to have a milkmaid, milking a cow, to be engraven thereon, which is to be seen at this day upon the Dort dollars, stivers, and doights; and similar figures were also set up on the watergate of Dort: and the milkmaid was allowed for her own life, and her heirs for ever, a very handsome annuity.

IV. *Manner of making Persons free at Alnwick, in Northumberland.*—Those who are to be made free, or, as the phrase is, *leap the well*, assemble in the market-place, very early in the morning, on the 25th of April, being St Mark's day. They appear on horseback, dressed in white, with white night-caps, and every man a sword by his side, attended by the four chamberlains, and the castle-bailiff, mounted and armed in the same manner. They then proceed, with music playing before them, to a large dirty pool, called Freeman's-Well, where they dismount, draw up in a body, then rush in all at once, and scramble through the mud as well as they can. After this they take a dram, put on dry clothes, remount their horses, gallop round the confines of the district, and then re-enter the town, sword in hand, and are met by women, dressed in ribands, with bells and garlands, dancing and singing. These are called Timber-wastes. On this day, the houses of the new freemen are distinguished by a holly-bush, as a signal for their friends to come and make merry with them on their return. This manner of making free is peculiar to Alnwick, according to a clause in the charter given them by King John, who, travelling this way, stuck fast in a hole, and thus punished the town, for neglecting to mend the roads.

V. *Substitute for Indigo.*—A Company has been formed in London for the manufacture of a substitute for Indigo, from whose prospectus the following are extracts.—"The objects of the Company are to encourage the manufacture, and to bring into general use, the *British Substitute for Foreign Indigo*; and to dye wool, stuffs, cloths, silks, and other fabrics *blue or other colours* (for which indigo is now used), with this substitute, in the preparation of which a new and wide field will be opened to the industry of this country.—By the use of the substitute, a considerable saving will accrue to the manufacturer, and the colours produced, such as *blues, blacks, greens, bronzes, browns, and various others* will be so fast as to resist the action of *light, air, and friction.* The articles so dyed will not turn white at the *edges or seams*, a quality long sought after, particularly in stuffs or cloths for furnitures and other purposes, in which exposure to light and heat is inevitable, and hitherto has proved destructive of their colours. Independently of fastness, a brilliancy of colour will be produced by the *substitute*, which cannot be attained with *indigo.*" "For more than half a century the first chemists of Europe have directed their best energies to the discovery of some means by which a perfect and uniform blue dye (other than indigo) might be obtained. Hitherto their researches have been unsuccessful, insurmountable objections presenting themselves in the caustic qualities of prussian blue (the only known substitute) in some processes hardening the wool when dyed and rendering it difficult to work, and in others destroying its fibre. At length a process has been discovered, for which a patent has been obtained, effectually neutralizing the objectionable properties of the component parts of prussian blue. A patent has also been obtained for the manufacture of the prussiates of potash and soda, rendering them fit for many purposes to which hitherto they have been inapplicable; whilst they are in every respect, in conjunction with certain ingredients, a perfect substitute for indigo as a dye for wool, &c. Facts which have borne the test of extensive experiment, demonstrate this substitute in all respects to be equal, and in many superior to, far exceeding in brilliancy and durability, any dye obtained by the use of indigo. By a new process (also patented) the wool may be dyed either in the flock, the fleece, the yarn or skein, or when woven into cloth. So also cotton, in skein or piece, silks and all organic substances, may be dyed with facility of any shade, and of a fast and durable colour. The manufacture of hats may be materially improved by this discovery, because a most brilliant and fast colour is produced by using the ingredients alluded to in the combination forming a black, which will resist the action of light and air, elements fatal to indigo. The materials of which the substitute for indigo is composed are in great abundance both in England and Ireland, but at present they are in most instances wasted. Their conversion into prussiate would provide extensive employment to that class of society (particularly in Ireland) who stand most in need of it, viz., the most indigent, as will be apparent from the following observations. The articles alluded to are blood, horns and hoofs of animals, bones, fish, cuttings of leather, old harness, and all other kinds of animal substance, old woollens, the refuse of woollen manufactures, old garments, &c. Substances the best calculated for the purpose, such as blood, fish, &c. are not rendered less useful by being in a corrupt state, for even animal manure may be used with some advantage. It is well known that in Ireland, the quantity of cattle slaughtered for the Government service, for export, and for the supply of our mercantile marine, is very considerable. The blood of those animals is now almost all wasted, as well as a great quantity of other animal matter forming the offal. The same remark applies to many parts of England, where, in numerous instances, those really valuable substances are not only unproductive of benefit, but entail great expense in the very prevention of their being productive of injury. Whole cargoes of fish are frequently thrown away in consequence of their corrupt state. Inconvenience and loss, therefore, are the least part of the argument, as their causes but too frequently contribute to engender sickness and contagious maladies; so that a demand for, and consumption of these substances, even in a corrupt state, whould not only open a new source of employment to the poor, but would very materially tend to the salubrity of all the principal towns in the United Kingdom, freeing them from filth and contagion. This discovery, therefore, it is submitted, ought, if for this reason only, to be looked upon in a national point of view, as offering, among inferior benefits, certainly a new source of employment for the indigent classes of this kingdom, and above all, a remedy against the accumulation of impure matter corrupting the atmosphere of our populous towns. The articles combined with animal substances in the preparation of the new dye are potash or soda, acid, and iron. Any object causing an increased consumption of the first mentioned article would materially benefit the Canadas, and improve the situation of our emigrants in that quarter of the world, promising as it is at present. But should potash become scarce, soda will answer every purpose in the manufacture of the substitute for indigo, and an increased demand for that article might advantage the poor both in England and Ireland, were they to be employed in converting salt into soda. The same observation applies to a new demand for acids, particularly since muriatic and sulphuric acids will be principally employed in these operations, and they are, almost exclusively, the produce of Great Britain. In reasoning on the foregoing observations it may be necessary, 1*st*, To give a statement of the actual quantity and value of the indigo consumed; 2*dly*, To compare that value with the estimated cost of the substitute for it; and, 3*dly*, To point out some of the advantages which cannot fail to arise to our manufacturers from the use of the substitute. As regards the first, reference being made to Marshall's Statistical Tables, it will appear that the average annual quantity of indigo entered *for consumption*, from 1814 to 1831, both inclusive, was 2,438,245 lb.; that is to say, the quantity remaining, after deducting the quantity exported from the gross quantity imported, will give the average prefixed. But the same author states, that the quantity thus arrived at is not the true measure of consumption, since the stock on hand and in bond at the commencement of this era has been gradually decreasing. The average quantity consumed in Great Britain may from these data and corroborative information be taken at three millions of pounds per annum. The prices of the eighteen years aggregated give—

| | s. | d. | | s. | d. |
|---|---|---|---|---|---|
| For low qualities . . . . . | 53 | 7 | @ | 75 | 4 |
| And for fine qualities . . . . . | 178 | 2 | | 204 | 0 |
| | 231 | 9 | | 279 | 4 |
| | | | | 231 | 9 |
| | | | | 511 | 1 |

leaving, as a result from the general average of the eighteen years, a medium price of 7s. 1½d. per lb. The price of indigo is not lower than it was in 1831; whilst the manufacturers are now induced by experience to employ the finer description of indigo, finding their advantage in so doing exceeds economy in price. But as the valuable tables alluded to cannot extend to a perfect computation of the relative proportions of fine, middling, and low qualities, a mean price of 5s. per lb. will be assumed in the following observations, at which price the value of the indigo annually consumed would amount to L. 750,000. As regards the second and third remarks, it may only be necessary to state that the cost of the substitute need never exceed an average of 2s. per lb. It would thus produce an annual saving of L. 450,000, independently of the material consideration, that the gross amount of cost L. 300,000, for the manufacture of the substitute would be expended on what is now wasted in this country, and in the labour of its poor inhabitants. The saving in the cost of the dye would enable the manufacturer to increase the wages of his workmen, or to sell the articles he may produce at a lower rate than those persons can who may continue to use indigo. The beneficial consequences would soon be felt in foreign markets, where English woollens are affected by a tariff on their declared value or cost of production, as in the United States of America, South America, Mexico, Hayti, and in some parts of the Continent of Europe. There the British manufacturer would be enabled to undersell the woollen manufacturers of Germany, &c.; and this observation applies equally to cotton and other articles. At present the woollen manufacturers of Germany are underselling the British, in consequence of their purchasing indigo equally low, and procuring labour at a more moderate rate. In Ireland, formerly, an extensive manufacture of woollens was carried on; now, the greater part of those establishments are closed; but with capital (not large), and the advantages provided by the substitute for indigo, they might be put into a state of activity, giving to the population what chiefly they require—employment, to render them as industrious, peaceable, and contented as any subject, in his Majesty's dominions. The subject is open to another important remark: Indigo is an article liable, in the event of war, to an immediate and a very considerable rise, by reason of the increased value of gold and silver, the increased charges for freight, insurance, and commissions, consequent thereto; whereas the price of the principal ingredients in the substitute for indigo would, in all probability, be decreased by the contingency becoming yet more abundant, in consequence of the extension of the Government contracts for salted provisions. The Government of France, under the Emperor Napoleon, offered a reward of one million of francs to the person who should discover a substitute for indigo in dyeing woollens. That offer cannot now be made available; but the King of the French takes a lively interest in this discovery, and would desire to reserve its advantages exclusively for France. Samples of wools and cloths dyed by this new process were exposed at the late public exhibition in Paris, and orders have been issued by the French Government to prepare with it cloth for the clothing of part of the French army. Samples of these cloths, and of wools dyed on the new plan, are now in London, and may be inspected at the Company's Office; as also samples of cloths and stuffs dyed in London, at Messrs Green and Whitehead's. Among these specimens are some literally worn threadbare—the colour still as fresh as when first dyed. To revert to the question of economy let it be observed, that, in using the substitute for indigo, one pound of it will dye a larger quantity of material than the like weight of indigo."

VI. *Yucca gloriosa*, Linn. or the Superb Adam's Needle, was introduced into Britain by old Gerarde so long ago as the close of the sixteenth century. It is a native of all the warmer states of North America; but as the first plants were imported from one of the West India islands, it was long regarded as too tender for the open air in this country; and being therefore kept confined in flower-pots, and under glass, it was rarely seen in flower. Within the last thirty and forty years, however, it has become a denizen of every well furnished shrubbery or large flower-garden, even in "cold Caledonia;" and, this season, its blossoms have displayed themselves in no fewer than five different garden establishments, public or private, in the immediate vicinity of this city. In the Royal Botanic Garden, Inverleith, two plants flowered, one of them bearing two flower-stems. At the nurseries of Messrs Dickson, Leith Walk, one specimen came in flower, and at the nurseries of Messrs Eagle and Henderson, in the same neighbourhood, another, both fine plants. In Mr Walter Dickson's beautiful garden at Redbraes, near the swan pond, a very noble specimen unfolded its blossoms: this was the most lofty of all, exceeding sixteen feet high. Lastly, in Dr Neill's garden at Canonmills Cottage, another fine specimen appeared, the flower-stem rising about twelve feet from the ground, and being clothed with numerous panicles. The plants at Redbraes and Canonmills may be regarded as the tall variety of *Yucca*, described by Haworth as a distinct species, under the name of *Y. conspicua*.—*Editor Q. J. A.*

VII. *Philosophical Facts.*—The change of properties which takes place when chemical attraction acts, is not confined to metals, but is a general result in every case where different bodies are brought into this state of combination or chemical union. Frequently we find that the properties of each body are totally changed; and that substances, from being energetic and violent in their nature, become inert and harmless, and *vice versa.* For instance, that useful and agreeable substance, culinary salt, which is not only harmless, but wholesome, and absolutely necessary to the well-being of man, is composed of two formidable ingredients, either of which taken into the stomach proves fatal to life: one of these is a metal, and the other an air; the former is called *sodium*, the latter *chlorine.* When presented to each other, the violence of their nature is manifested by their immediately bursting out into flame, and instantly they are both deprived of their virulence. Can any thing be more striking than the change of properties in this case; and who could have supposed that culinary salt is composed of a metal united to an air? The medicine called Glauber's salt is another instance: it is composed of two caustic poisons of different kinds; one called oil of vitriol, and the other barilla or soda. There are also two substances known to chemists, which are disgustingly bitter liquids: one is called nitrate of silver, and the other hyposulphate of soda; when mixed they form a compound of considerable sweetness. But the atmosphere which we breathe is the most extraordinary of all instances: it must be surprising to those who are unacquainted with the fact, that atmospheric air, indispensable as it is to life, is composed of the same ingredients as that most violent and destructive liquid called *aqua fortis*, or nitric acid. This powerful acid being made to act upon sugar, the sweetest of all things, produces a substance intensely bitter to the taste. Charcoal is, of all known substances, the most difficult to convert into vapour; so much so, indeed, that the conversion has never yet been decidedly effected: it is also a very solid substance; and diamond, which is nothing but crystallized charcoal, is one of the hardest bodies in nature. Sulphur, in the solid state, is also a hard substance, and to hold it in vapour requires a high temperature. But when these two substances, carbon and sulphur, are made to combine chemically, so as to form the substance called bisulphuret of carbon, their properties are strikingly changed. Instead of the compound being hard, it is a thin liquid, and is not known to freeze or solidify at any degree of cold that can be produced. Instead of the compound being difficult to vaporise, it is, of all liquids, one of the most evaporable. Charcoal is the blackest substance with which we are acquainted—sulphur is of a most lively yellow hue; but the compound is as colourless as water. A new smell and taste are acquired, and, in a word, there is not one point of resemblance with the component. These facts are strikingly illustrative of the change of properties which follows on the exertion of chemical attraction between the ultimate particles of bodies.—*Donovan's Chemistry.*

VIII. *Geological Changes in Great Britain.*—That the face of the globe has successively undergone total changes, at different remote epochs, is now a fact beyond all dispute; as also that, long anterior to the creation of man, this world was inhabited by races of animals, to which no parallels are now to be found; and those animals themselves only made their appearance after the lapse of ages, during which no warm-blooded creatures had an existence. It has been further remarked by zoologists, that the animals which first appeared in these latitudes were analogous to such as now inhabit tropical regions exclusively; and that it was only at a period immediately antecedent to the creation of the human race, that species similar to those of the existing era began to appear in northern latitudes. Similar peculiarities have been also found to mark the vegetation of corresponding periods. It would hardly be credited, by persons unacquainted with the evidence upon which such facts repose, that, in the most dreary and desolate northern regions of the present day, there once flourished groves of tropical plants, of Coniferæ like the Norfolk island and Araucarian pines, of bananas, tree-ferns, huge cacti, and palms; that the marshes were filled with rush-like plants, fifteen or twenty feet high, the coverts with ferns like the undergrowth of a West Indian island, and that the vegetation, thus inconceivably rich and luxuriant, grew amidst an atmosphere that would have been fatal to the animal world. Yet nothing can well be more certain than that such a description is far from being overcharged. In the coal formation, which may be considered the earliest in which the remains of land plants have been discovered, the flora of England consisted of ferns, in amazing abundance; of large coniferous trees, of species resembling lycopodiaceæ, but of most gigantic dimensions; of vast quantities of a tribe, apparently analogous to cactæ, or euphorbiaceæ, but perhaps not identical with them; of palms and other monocotyledones; and finally, of numerous plants, the exact nature of which is as yet extremely doubtful. Between two and three hundred species have been detected in this formation, of which two thirds are ferns.—*Lindley and Hutton's Fossil Flora.*

IX. *Scarlet Trefoil, Trifolium incarnatum.*—" It is well known that all the clovers like a solid bottom, and from experience it appears, that such is more particularly the case with the scarlet trefoil. When the land on which it has been sown has been rendered fine and light by repeated ploughings, the crop has frequently been an entire failure, and I have never heard of a single instance of failure when the seed was committed to an unploughed surface. In the beginning of October 1833, I sowed a part of garden-ground, the soil being strong and rich, upon a chalk bottom; the seedlings came up well, but in the course of the winter all perished with the exception of a single plant. In September Colonel Beach sowed a few acres in a field about a hundred yards distant, which he had ploughed and dressed for the purpose, the soil being in this case of a similar nature to that mentioned above, and here, again, the crop was a failure. At a distance of about two hundred yards, and upon soil precisely similar, and in the same season, a stiff unploughed wheat stubble, produced as fine a crop as could be desired. The farmer who had this crop had previously pursued the same plan, and had realized from this produce upwards of L. 40 per acre. I find also that the crop has frequently failed in the county of Essex, where the ground had been ploughed before sowing. In September last I sowed 4½ acres upon a barley-stubble, without any preparation whatever, and there is abundance of plants. I do not mean to assert positively that no crop will follow after ploughing, but experience proves, that where this is done, success is very doubtful. With respect to the properties of the trefoil, I do not believe that there is a more hearty green food in existence. Cattle are extremely fond of it. Farm-horses, during their spring-work, may be kept in the highest condition on it, and after affording abundant food, it may be cleared off in time for turnips, which, upon trial, have succeeded perfectly well after the trefoil. Scarifying the ground has been found to answer well, and where the surface is foul, it is certainly advantageous."—*British Farmer's Magazine for April* 1835.

X. *Pin-Making.*—The women and children who fix the heads are paid at the rate of 1s. 6d. for every twenty thousand. A skilful operator can, with great exertion, do twenty thousand per day; but from ten to fifteen thousand is the usual quantity. Children head a much smaller number, varying, of course, with the degree of their skill. The man who pickles and tins the pins usually gets one penny per pound for the work, and employs himself, during the boiling of one batch of pins, with drying those previously tinned. He can earn about 9s. per day; but out of this he pays about 3s. for his assistant. The arranging of pins side by side in paper is generally performed by women. The pins come from the last process in wooden bowls, with the points projecting in all directions. A woman takes up some, and places them on the teeth of a comb, whilst, by a few shakes, some of the pins fall back into the bowl, and the rest, being caught by their heads, are detained between the teeth of the comb. Having thus arranged them in a parallel direction, she fixes the requisite number between two pieces of iron, having twenty-five small groves, at equal distances; and having previously doubled the paper, she presses it against the points of the pins until they have passed through the two folds which are to retain them. The pins are then relieved from the grasp of the tool, and the process repeated with others. A woman gains about 1s. 6d. per day by papering; but children are sometimes employed, who earn from 6d. per day and upwards.—*Babbage's Economy of Machinery and Manufactures.*

XI. *Consumption of Staple Articles in England.*—The following is an accurate estimate of the home consumption of England in the great staple articles of commerce and manufactures. Of wheat fifteen million quarters are annually consumed in Great Britain; this is about a quarter of wheat to each individual. Of malt twenty-five million bushels are annnally used in breweries and distilleries in the United Kingdom, and there are forty-six thousand acres under cultivation with hops. Of the quantity of potatoes, and other vegetables consumed, we have no accounts. Of meat about one million two hundred and fifty thousand head of cattle, sheep, and pigs are sold during the year in Smithfield market alone, which is probably about a tenth of the consumption of the whole kingdom. The quantity of tea consumed in the United Kingdom, is about thirty million pounds annually. Of sugar nearly four million hundred-weights, which is a consumption of twenty pounds for every individual, reckoning the population at twenty-five millions: and of coffee about twenty million pounds are annually consumed. Of soap one hundred and fourteen million pounds are consumed: and of candles about a hundred and seventeen million pounds. Of clothing we annually manufacture about two hundred million pounds of cotton wool, which produces twelve hundred million yards of calico, and various other cotton fabrics, and of these we export about a third, so that eight hundred million yards remain for home consumption, being about thirty-two yards annually for each person; the woollen manufacture consumes about thirty million pounds of wool.

# QUARTERLY AGRICULTURAL REPORT.

August 1835.

The weather in the last quarter has been unpropitious to vegetation. The transition of atmospheric phenomena has been too violent and rapid for profitable vegetation. Frosty nights have been succeeded by cold, tempestuous windy days. Acceptable showers have preceded cold, steady northern winds, which have withered plants for a week at a time. Hot suffocating air has produced severe thunderstorms, which, in their turn, have been followed by a dry atmosphere. Under every transition of the air, cold and drought have prevailed, varied by occasional hot gleams of sunshine, so that rivers and springs have almost ceased to flow. These circumstances have produced similar and opposite effects on different soils. Sandy soils have been in a manner burnt up, and hard thin clays have produced little straw, and less grass. Deep soils of every kind have been able to support luxuriant vegetation, except in pastured grass, which seems to have withered and died on being bitten by animals. All these varied causes and effects render it rather difficult to give an accurate report of the state of the crops; but we shall give our opinion of them, such as it is, as formed after a partial excursion through the counties of Perth, Kinross, Fife, Forfar, Kincardine, Aberdeen, Stirling, Dumbarton, Lanark, Ayr, Dumfries, Linlithgow, Roxburgh, Berwick, and Haddington.

Generally speaking, drought has affected the growth of plants on the east coast of Scotland more than the west, which has been favoured with seasonable showers, so that the whole crops in the latter districts are fully larger than in the former. In our last report, the wheat was pronounced good: it has continued to bear that character, and will certainly prove more than an average crop. On light and sandy soils, it has spotted a little, and part of it has come too rapidly forward towards maturity; but it is nevertheless a heavy crop. The ears and straw are long and clean. As to quality, it may perhaps be unequal; but as the weather has been dry, we are reminded of an old saying in this country, which is essentially true in regard to wheat, " that drouth and famine never come together."—On deep friable and damp soils, barley is a heavy crop, thick in the ground, and long in the ear. On poor, hard, thin sandy and gravelly soils, it is thin and light, and in such situations, no rain could now prevent it coming too soon forward.—Oats, we are sorry to say, is a deficient crop upon almost all kinds of soil. The straw is small and short, thin in the ground, and late.—Pease and beans are very luxuriant and promise weighty returns of corn. On poor thin clays an exception to luxuriance is found in the straw of the bean. The fodder of this species of crop will, in some degree, make up for the deficiency of oat-straw.—Potatoes present a very varied aspect. Some fields are full of blanks, none free of them, while all, on the east coast, are decidedly a deficient crop. In many instances, the stems will not meet over the drills. The severe frosts about the middle of June blackened much of the stems in the higher districts, and along rivers which run in an east and west direction. On the western parts of the country they are much better, and in many instances indicate a heavy crop. It is probable that speculators in potatoes will not be supplied with so many as usual to ship to London, but there will certainly be as much as will supply the immediate demands of the people.--We have not seen, for many years, so varied an appearance of the turnip crop as this. Blanks occur every where, and many fields are certainly too late to afford much nourishment in winter. All the early sown are good; those which had been sown after the cold and heavy rains in June are making little progress, and will prove a deficient crop.—Hay is a weighty crop on the west coast of Scotland, but on the east it is deficient. The aftermath has proved a complete failure. Meadow-hay is a light crop, although of good quality.—As to pastures, we have not seen them so bare, at this time of year, since 1826. Rain may yet recover them a little before the end of autumn.

Harvest goes on apace in certain districts. Some wheat, and barley. and pease have already been cut down; but the last week of August must elapse ere the harvest will be general throughout the country. The corn has ripened much quicker than could have been anticipated a month ago, partly from the increased fertility of the soil, by good husbandry, but more probably from the drought quickening the process of blanching, and the winds shaking the roots of the plants. Very little of the corn is laid down, and in consequence the straw is generally clean. We observe evident symptoms of economy, and of means used to obtain profit, which would have been overlooked in prosperous times. Bone-dust is economically deposited in clumps, at certain intervals, instead of being sown continuously along the drill, the turnip-seed being also sown in clumps, with the bones. Patches and even fields of flax may again be seen. Failure in the crops of flax in Russia for the last three years, has raised the price so far as to induce the Irish farmer to compete in the market with the Russian, and so long as its culture will remunerate the grower more than that of corn, the Irish farmer will continue to grow it, while some of our own farmers will endeavour to participate in the profits. About three-fourths more flax is grown in Ireland this than last year. The quantity grown may be computed at 20,000 tons, one-half of which will probably be in the market for exportation.

As might be expected from the state of the pastures, lean cattle have made little improvement; their price has in consequence fallen; and for the same reason fat stock have become scarce, and they yet fetch good prices. Lambs are not so good as they were last year, never having recovered from the check which they received from the drought in spring. The demand for sheep from England has slackened much, and their prices have therefore generally fallen. Wool is considerably down, when mixed hogg with ewe; the fall in Cheviot wool is 3s., and in black-faced fully more; but Leicester hoggs' wool maintains its former rates, some of which has been sold as high as 44s. per stone of 24 lb. The new central market for the sale of wool in Scotland was held at Perth on the 7th July. Many people, both buyers and sellers, attended. The English wool staplers countenanced the new undertaking, and they will no doubt find it redound to their interest afterwards. Little business was done in the former part of the day, not only on account of ignorance in the farmers in that part of the country, of the method of conducting a wool market, but of their unwillingness to yield to the lower prices offered by the wool buyers. Some brought in samples; others their stock of wool; whilst many brought neither sample nor stock. The day fixed on was acknowledged on all hands to have been unfortunately chosen, because the farmers had not learnt the results of the wool fairs at Yetholm on the 5th, and at Dunse about the same time; and the buyers anticipated serving themselves better at the Inverness fair on the following days. But a little experience will arrange the time and conduct of the market in future to the entire satisfaction of all parties.

---

## FOREIGN CORN MARKETS.

Danzig, *July* 27.—The trade has been almost at a stand since our last, for the factors cannot make up their minds yet to lower their terms, and, with the exception of one lot of about ten lasts of secondary quality, at about 28s., nothing has been done. The temperature has undergone a great change: since Friday the wind went round to the N. and NE., and we have since had a chilling atmosphere, and occasional heavy showers; however, the coldness prevents the rain doing much harm, although the rye harvest is now in full progress, and unless the rain becomes more frequent and heavier, we hope our present fine prospects will not be blighted. The reports from some districts are less favourable than from some others; however, in Poland, which is our main source, the crops promise a full average, if secured in dry weather.

Rostock, *July* 27.—In our Corn Market nothing is doing. The weather is very favourable for the crops, and cutting of Rye is already general. The price of Wheat is at present nominally 80ro. or 2s. 3d. qr. free on board.

Konigsberg, *July* 29.—The crops of Wheat, Barley, and all kinds of Pulse, are still backward this year, and Oats look but thin and poorly. Reaping of Rye is now general, and the quality, though said not to be so fine as last year, is yet very good. Prices may be considered nominally without alteration.

Embden, *August* 8.—Our market for Oats is dull, and purchases might now be effected at somewhat lower prices. Fine new stout polder Winter Barley may be bought at 15s. 6d. to 16s. per qr. free on board. In other articles scarcely any thing doing, and prices may be quoted nominally unaltered.

Copenhagen, *August* 8.—We have had beautiful weather for the harvest, which, however, only commenced last week; but during the last two days it has changed, and is also windy. The Corn trade remains very dull here.

**Hamburgh**, August 8.—The harvest of Rapeseed is nearly all secured in the districts from whence we receive our supplies, and has been favoured by the finest possible weather. The condition of the new Seed of course is excellent. In the Northern part of Holstein, Jutland, and the Danish Islands, the crop is said to be only half an usual crop; in Hanover it is reported under an average, and almost a failure in Jeverland; but to counterbalance these deficiencies, the breadth sown in Mecklenburg this season is greatly increased, and the yield good, as well as along the Holstein Coast of the Elbe, up to Brunsbruttel. On the whole, we apprehend, the produce will be rather greater than last year's, which, however, was deficient. The English and Dutch markets having been dull, prices have receded to equal to about L. 27 to L. 27, 6s. per last of 10 quarters, free on board at the Elbe ports, and on the East Coast of Holstein, and in Mecklenburg, to L. 25, 15s. to L. 26 The crop, we learn from Holland, turns out much less than was expected, and some Dutch orders have been received this week, limited at L. 25 to L. 25 10s. per last, free on board in the Baltic: but we believe the limits have not been sufficient to admit of their execution. Some Rape Cakes have been sold this week at L. 4, 8s., and Linseed Cakes at L 6, 3s. per tog. A lot of about 200 tons of fine oblong Linseed Cakes, might be bought at a Baltic port at L. 6 per ton, and L. 5, 16s. we believe has been refused for them. In Grain there is nothing doing, except for home-consumption. Red Cloverseed has advanced 1s. to 2s. per cwt., there being some unfavourable advices about the crop, and orders here from Holland. We quote red Seed 34s. 6d. to 37s. per cwt., white 35s. to about 49s. per cwt. New Magdeburg Carraways are worth 22s. to 24s. 6d. per cwt. The weather since yesterday has become showery and uncertain.

**Rotterdam**, August 12.—The new white Zealand Wheat turns out rather better than the first samples gave us reason to expect. The new Rye is also very fine. In consequence of a little rain that we have had, both Oats and Cloverseed have receded a trifle in value.

---

## THE REVENUE.

*ABSTRACT of the Net Produce of the Revenue of Great Britain, in the Quarters and Years ended on the 5th of July* 1834, *and 5th of July* 1835, *showing the Increase and Decrease on each head thereof.*

| | Quarters ended July 5. | | Increase. | Decrease. | Years ended July 5. | | Increase. | Decrease. |
|---|---|---|---|---|---|---|---|---|
| | 1834. | 1835. | | | 1834. | 1835. | | |
| | £ | £ | £ | £ | £ | £ | £ | £ |
| Customs, . . | 4,077,207 | 4,461,627 | 384,420 | . . | 15,547,210 | 18,004,725 | 2,457,515 | . . |
| Excise, . . . . | 3,053,509 | 2,502,048 | . . | 551,461 | 14,792,872 | 11,598,607 | . . | 3,194,[illegible] |
| Stamps, . . . | 1,696,314 | 1,624,171 | . . | 72,143 | 6,694,602 | 6,493,028 | . . | 131,[illegible] |
| Post-Office, | 338,000 | 342,000 | 4,000 | . . | 1,367,000 | 1,390,000 | 23,000 | . . |
| Taxes, . . . . | 1.925,429 | 1,500,393 | . . | 425,036 | 4,869,610 | 3,887,591 | . . | 982,[illegible] |
| Miscellaneous, | 5,475 | 10,789 | 5,314 | . . | 48,200 | [illegible] | 13,736 | . . |
| | 11,095,934 | 10,441,028 | 393,734 | 1,048,640 | 43,249,394 | 41,435,887 | 2,494,251 | 4,307,[illegible] |
| | Deduct Increase, . . | | | 393,734 | Deduct Increase, | | | 2,494,[illegible] |
| | Decrease on the quarter, | | | 654,906 | Decrease on the year, | | | 1,813,[illegible] |

## TABLES OF PRICES, &c.

*The Average Prices of the different kinds of GRAIN, per Imperial Quarter, sold at the following Markets :—*

### LONDON.

| Date. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| May 1. | 40 11 | 32 4 | 24 11 | 31 6 | 36 0 | 36 9 |
| 8. | 40 11 | 32 5 | 24 4 | 31 3 | 36 8 | 37 3 |
| 15. | 42 9 | 31 10 | 24 4 | 31 6 | 35 6 | 38 4 |
| 22. | 42 2 | 28 7 | 24 2 | 32 6 | 36 4 | 39 9 |
| 29. | 42 0 | 28 7 | 23 10 | 31 6 | 37 2 | 39 11 |
| June 5. | 42 0 | 27 9 | 24 2 | 31 0 | 37 4 | 39 10 |
| 12. | 42 9 | 30 10 | 24 5 | 30 4 | 38 2 | 38 0 |
| 19. | 43 6 | 28 7 | 24 4 | 31 4 | 37 8 | 40 6 |
| 26. | 42 6 | 26 1 | 23 5 | 31 2 | 38 6 | 39 5 |
| July 3. | 43 7 | 29 4 | 23 5 | 32 6 | 38 9 | 39 8 |
| 10. | 44 7 | 28 10 | 23 7 | 34 6 | 40 6 | 40 11 |
| 17. | 46 0 | 29 10 | 23 9 | 33 6 | 46 0 | 40 1 |
| 24. | 47 2 | 27 11 | 25 1 | 30 4 | 39 10 | 40 5 |

### DUBLIN.

| Date. | Wheat Per Bar. 20 St. | Barley Per Bar. 16 St. | Bear Per Bar. 17 St. | Oats Per Bar. 14 St. | Flour Per Bar 9 St. |
|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. |
| May 1. | 22 7 | 13 9 | 12 0 | 12 10 | 13 3 |
| 8. | 24 6 | 14 0 | 11 9 | 13 6 | 13 9 |
| 15. | 25 0 | 15 0 | 12 9 | 13 9 | 14 0 |
| 22. | 25 6 | 13 6 | 11 6 | 12 3 | 14 2 |
| 29. | 23 6 | 13 10 | 11 4 | 12 6 | 14 0 |
| June 5. | 24 0 | 14 0 | 11 6 | 12 11 | 13 10 |
| 12. | 24 5 | 13 6 | 12 0 | 12 6 | 14 0 |
| 19. | 24 4 | 13 2 | 12 2 | 12 6 | 14 0 |
| 26. | 24 6 | 13 6 | 13 0 | 12 9 | 14 0 |
| July 3. | 23 8 | 13 6 | 12 4 | 13 0 | 13 10 |
| 10. | 24 0 | 14 0 | 13 2 | 13 0 | 13 10 |
| 17. | 27 0 | 13 6 | 12 8 | 12 6 | 15 6 |
| 24. | 26 0 | 13 6 | 12 6 | 13 0 | 15 0 |

### LIVERPOOL.

| Date. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| May 5. | 38 8 | 29 6 | 22 4 | 31 2 | 35 2 | 37 4 |
| 12. | 38 4 | 28 9 | 22 6 | 30 8 | 35 0 | 39 1 |
| 19. | 39 9 | 28 11 | 22 10 | 31 7 | 35 6 | 38 9 |
| 26. | 39 5 | 29 8 | 23 2 | 31 4 | 34 10 | 38 2 |
| June 2. | 39 7 | 29 3 | 23 1 | 32 0 | 36 2 | 39 0 |
| 9. | 39 7 | 30 10 | 22 9 | 31 6 | 36 6 | 38 6 |
| 16. | 40 9 | 27 8 | 23 3 | 33 0 | 37 0 | 41 9 |
| 23. | 41 8 | 27 4 | 23 6 | 32 6 | 36 9 | 41 1 |
| 30. | 40 5 | 26 10 | 23 5 | 30 10 | 38 6 | 41 0 |
| July 7. | 40 9 | 31 0 | 23 10 | 31 2 | 39 0 | 41 8 |
| 14. | 40 10 | 30 4 | 23 6 | 32 4 | 39 6 | 41 10 |
| 21. | 40 5 | 27 1 | 23 2 | 35 0 | 40 10 | 38 1 |
| 28. | 41 8 | 27 6 | 23 3 | 30 0 | 40 0 | 41 0 |

### EDINBURGH.

| Date. | Wheat. | Barley. | Oats. | Pease. | Beans. |
|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. |
| May 6. | 45 0 | 33 3 | 25 2 | 32 0 | 33 6 |
| 13. | 44 4 | 34 0 | 25 7½ | 33 6 | 35 0 |
| 20. | 44 2 | 32 2 | 26 0 | 33 8 | 35 8 |
| 27. | 45 3 | 33 0 | 27 1 | 38 6 | 39 0 |
| June 3. | 45 2 | 33 6 | 27 3 | 36 8 | 38 10 |
| 10. | 45 0 | 33 6 | 26 3 | 37 0 | 38 0 |
| 17. | 44 2 | 34 0 | 26 5 | 35 0 | 36 0 |
| 24. | 45 5 | 33 6 | 27 2 | 35 6 | 35 10 |
| July 1. | 47 8 | 33 6 | 28 0 | 35 6 | 37 0 |
| 8. | 49 7 | 34 2 | 28 6 | 36 0 | 37 6 |
| 15. | 50 7 | 34 6 | 29 0 | 36 4 | 37 8 |
| 22. | 50 1 | 34 10 | 28 3 | 37 2 | 38 0 |
| 29. | 49 0 | 32 6 | 27 9 | 37 6 | 38 0 |

*TABLE shewing the Weekly Average Prices of GRAIN, made up in terms of 7th and 8*
*Geo. IV. c. 58, and the Aggregate Averages which regulate the Duties payable on FOREIG*
*CORN; the Duties payable thereon, from 1st May to 1st August 1835.*

| e. | Wheat. | | | Barley. | | | Oats. | | | Rye. | | | Pease. | | | Beans. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. |
| 35. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| y 1. | 38 6 | 39 2 | 47 8 | 31 2 | 32 3 | 13 10 | 24 2 | 23 3 | 12 3 | 31 3 | 31 1 | 22 9 | 34 11 | 35 3 | 16 9 | 36 9 | 36 0 |
| 8. | 38 9 | 38 11 | 48 8 | 31 8 | 32 1 | 13 10 | 23 8 | 22 5 | 12 3 | 31 0 | 31 7 | 22 9 | 36 7 | 35 3 | 16 9 | 36 11 | 36 6 |
| 15. | 39 8 | 38 11 | 48 8 | 31 5 | 31 6 | 15 4 | 23 10 | 23 6 | 12 3 | 31 3 | 31 7 | 22 9 | 34 4 | 35 2 | 16 9 | 37 8 | 36 9 |
| 22. | 40 0 | 39 0 | 47 8 | 30 9 | 31 7 | 15 4 | 23 11 | 23 9 | 12 3 | 30 7 | 31 4 | 22 9 | 35 10 | 35 5 | 16 9 | 38 1 | 37 1 |
| 29. | 39 10 | 39 3 | 47 8 | 30 4 | 31 2 | 15 4 | 23 8 | 23 9 | 12 3 | 32 6 | 31 4 | 22 9 | 36 0 | 35 5 | 16 9 | 38 11 | 37 5 |
| e 5. | 39 8 | 39 5 | 47 8 | 30 10 | 31 4 | 15 4 | 23 10 | 23 10 | 12 3 | 31 7 | 31 11 | 22 9 | 37 4 | 35 10 | 16 6 | 39 2 | 37 11 |
| 12. | 40 1 | 39 8 | 47 8 | 29 6 | 30 9 | 16 10 | 24 2 | 23 10 | 12 3 | 30 0 | 31 2 | 22 9 | 36 7 | 36 1 | 15 6 | 39 9 | 38 5 |
| 19. | 40 4 | 39 11 | 47 8 | 29 7 | 30 5 | 16 10 | 24 4 | 23 11 | 12 3 | 31 6 | 31 3 | 22 9 | 38 4 | 36 5 | 15 6 | 40 2 | 38 11 |
| 26. | 40 0 | 40 11 | 46 8 | 28 8 | 29 11 | 18 4 | 23 6 | 23 11 | 12 3 | 31 5 | 31 3 | 22 9 | 37 7 | 39 4 | 11 0 | 40 0 | 39 4 |
| y 3. | 40 5 | 40 1 | 46 8 | 29 0 | 29 8 | 18 4 | 23 6 | 23 11 | 12 3 | 30 1 | 31 2 | 22 9 | 38 3 | 37 4 | 14 0 | 40 4 | 39 9 |
| 10. | 41 7 | 40 4 | 46 8 | 27 11 | 29 3 | 18 4 | 23 8 | 23 10 | 12 3 | 35 0 | 31 7 | 22 9 | 38 10 | 37 10 | 14 0 | 40 7 | 40 9 |
| 17. | 42 1 | 40 9 | 46 8 | 28 10 | 28 11 | 19 10 | 23 11 | 23 10 | 12 3 | 29 7 | 31 3 | 22 9 | 45 6 | 39 2 | 11 0 | 40 1 | 40 2 |
| 24. | 43 6 | 41 4 | 45 8 | 28 5 | 28 9 | 19 10 | 24 9 | 23 11 | 12 3 | 31 0 | 31 5 | 22 9 | 39 7 | 39 8 | 11 0 | 40 2 | 40 3 |

The *MONTHLY RETURNS*, *published in terms of* 9*th Geo. IV. c.* 60, *showing the Quanti Corn, Grain, Meal, and Flour imported into the United Kingdom in each Month; the Qua upon which duties have been paid for home-consumption, during the same Month; and the titles remaining in Warehouse at the close thereof: from* 5*th January to* 5*th April* 1835.

| Month ending | IMPORTED. | | | CHARGED WITH DUTY. | | | REMAINING IN WAREH | | |
|---|---|---|---|---|---|---|---|---|---|
| | From Foreign Countries. | From British Possessions. | Total. | From Foreign Countries. | From British Possessions. | Total. | From Foreign Countries. | From British Possessions. | T |
| ay 5. 1835. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Q |
| heat, . . | 2,051 1 | 22 4 | 2,073 5 | .. | 553 4 | 553 4 | 596,991 0 | 50,109 1 | 64 |
| arley, . . | 21,883 0 | .. | 21,883 0 | 33,638 0 | .. | 33,638 0 | 144,189 6 | 25 1 | 14 |
| ats, . . | 10,854 1 | .. | 10,854 1 | 61 3 | .. | 61 3 | 336,288 0 | 666 0 | 33 |
| ye, . . . | 21 3 | .. | 21 3 | .. | .. | .. | 4,710 6 | .. | 4 |
| ease, . . | 4,488 5 | .. | 4,488 5 | 773 7 | .. | 773 7 | 10,053 1 | 44 4 | 1 |
| eans, . . | 1,030 3 | .. | 1,030 3 | 1,126 0 | .. | 1,126 0 | 33,530 2 | .. | 3 |
| Totals, . | 40,328 5 | 22 4 | 40,351 1 | 35,599 2 | 553 4 | 36,152 6 | 1,125,762 7 | 50,844 6 | 1,17 |
| *June* 5. | | | | | | | | | |
| heat, . . | 699 0 | 236 6 | 935 6 | 4 4 | 1,761 2 | 1,765 6 | 586,685 1 | 48,584 5 | 63 |
| arley, . . | 14,565 3 | .. | 14,565 3 | 64,990 0 | .. | 64,990 0 | 94,726 4 | 25 1 | 9 |
| ats, . . | 17,993 1 | .. | 17,993 1 | 138 0 | .. | 138 0 | 349,485 7 | 666 0 | 35 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 4,710 6 | .. | 4 |
| ease, . . | 860 6 | 0 2 | 861 0 | 84 6 | 44 6 | 129 4 | 10,556 0 | .. | 1 |
| eans, . . | 5,896 0 | .. | 5,896 0 | 475 0 | .. | 475 0 | 38,941 6 | .. | 3 |
| Totals, . | 40,014 2 | 237 0 | 40,251 2 | 65,692 2 | 1,805 0 | 67,498 2 | 1,085,106 0 | 49,275 6 | 1,13 |
| *July* 5. | | | | | | | | | |
| heat, . . | 0 4 | 1,446 3 | 1,446 7 | 0 4 | 1,994 6 | 1,995 2 | 578,858 7 | 48,036 2 | 6 |
| arley, . . | 4,773 5 | .. | 4,773 5 | 4,148 2 | .. | 4,148 2 | 93,235 2 | 25 1 | 9 |
| ats, . . | 20,001 4 | .. | 20,001 4 | 455 0 | .. | 455 0 | 371,686 1 | 666 0 | 37 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 4,242 6 | .. | |
| ease, . . | 1,787 3 | 0 2 | 1,787 5 | 359 7 | 0 2 | 360 1 | 11,904 5 | .. | 1 |
| eans, . . | 5,709 0 | .. | 5,709 0 | 3,688 0 | .. | 3,618 0 | 40,897 2 | .. | 4 |
| Totals, . | 32,272 0 | 1,446 5 | 33,718 5 | 8,581 5 | 1,995 0 | 10,576 5 | 1,100,824 7 | 48,727 3 | 1,1 |
| ay 5. 1835. | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | c |
| lour, . . | 6,487 0 3 | 10 3 19 | 6,497 3 22 | 126 0 0 | 3,600 2 9 | 3,726 2 9 | 315,767 2 2 | 29,438 1 15 | 34 |
| atmeal, . | 33 1 17 | .. | 33 1 17 | .. | .. | .. | 27 2 9 | .. | |
| Totals, . | 6,520 1 20 | 10 3 19 | 6,531 1 11 | 126 0 0 | 3,600 2 9 | 3,726 2 9 | 315,795 0 11 | 29,438 1 15 | 34 |
| *June* 5. | | | | | | | | | |
| lour, . . | 5,589 2 16 | .. | 5,589 2 16 | 4 3 9 | 1,309 0 20 | 1,314 0 1 | 207,177 2 7 | 27,837 0 12 | 23 |
| atmeal, . | .. | .. | .. | .. | .. | .. | 7 0 6 | .. | |
| Totals, . | 5,589 2 16 | .. | 5,589 2 16 | 4 3 9 | 1,309 0 20 | 1,314 0 1 | 207,184 2 13 | 27,837 0 12 | 23 |
| *July* 5. | | | | | | | | | |
| lour, . . | 1,766 2 16 | 6,006 3 20 | 7,773 2 8 | 8 3 15 | 1,092 1 17 | 1,101 1 4 | 296,585 2 26 | 32,949 0 26 | 3 |
| atmeal, . | .. | | .. | .. | .. | .. | 5 2 26 | .. | |
| Totals, . | 1,766 2 16 | 6,006 3 20 | 7,773 2 8 | 8 3 15 | 1,092 1 17 | 1,101 1 4 | 296591 1 24 | 32,949 0 26 | 3 |

## *PRICES of BUTCHER-MEAT.*

| | SMITHFIELD, *Per Stone of* 14 lb. | | MORPETH, *Per Stone of* 14 lb. | | EDINBURGH, *Per Stone of* 14 lb. | | GLASGOW, *Per Stone of* 14 lb. | |
|---|---|---|---|---|---|---|---|---|
| Date. | Beef. | Mutton. | Beef. | Mutton. | Beef. | Mutton. | Beef. | Mutton. |
| 1835. | | | | | | | | |
| May | 6/ @ 7/ | 6/ @ 7/3 | 5/9 @ 6/9 | 5/6 @ 6/9 | 5/6 @ 6/6 | 5/3 @ 8/ | 6/ @ 6/3 | 6/ [illegible] |
| June | 6/9 8/3 | 6/3 7/9 | 6/3 8/ | 5/9 7/6 | 6/6 7/6 | 6/ 7/ | 6/3 7/6 | 6/6 |
| July | 6/9 7/6 | 6/3 6/9 | 6/6 7/3 | 6/ 6/9 | 6/3 7/3 | 6/ 7/ | 6/6 7/6 | 6/3 |

## *PRICES of English and Scotch WOOL.*

ENGLISH, per 16 lb.—*Merino*, Washed, 26/6 @ 30/; in Grease, 20/ @ 24/.—*South Down*, 25/ [illegible] cester, 22/6 @ 25/6; Ewe and Hogg, 20/ @ 22/.—*Locks*, 12/6 @ 15/; *Moor*, 10/6 @ [illegible] 6.

SCOTCH, per 24 lb.—*Leicester*, 40/ @ 44/; Ewe and Hogg, 34/ @ 38/6.— [illegible] / @ 32/.—[illegible] [illegible] @ 30/ Washed, 20/ @ 22/6; Laid, 16/6 @ 18/9; *Moor*, White, 13/ [illegible], Laid, 10/6 @ 11/

# THE
# QUARTERLY
# JOURNAL OF AGRICULTURE.

## ON RECLAIMING WASTE LAND.

By Mr William Aiton, Hamilton.

Having always considered agriculture to be the most important branch of industry in which a nation can be engaged, in so far as to raise from its own soil a due supply of food for its own population, I have often endeavoured to draw attention to the subject, by detailing what seemed to me best calculated to promote the interest of that science. It is for that purpose I now try, through the medium of this Journal, to call attention to what seems to me one of the most interesting branches of husbandry which is far from being yet duly attended to, namely, the general melioration of the soil, and in particular the reclaiming of a still greater portion of waste land, so as to render the nation independent of foreign states for the supply of grain, roots, and dairy produce, which every person conversant in rural matters, or in *true* political economy, must see to be a matter of primary importance. Every man will, no doubt, pursue the line of business that he thinks best calculated to secure his own interest in the circumstances in which he is placed, without much regard to national prosperity; but when any branch of national industry of such importance as the raising of grain from the soil is overlooked, the Government ought to take measures to protect, encourage, or even to enforce, due attention to the raising of every possible species of food at home, to all the extent of national supply.

I am aware that speculative economists have recommended not only the neglect of waste land, but proposed that the cultivation and cropping of all land of an inferior or medium quality should be abandoned, and such land turned into pasture; and that we should trust to foreign markets for such grain as we may need, beyond what can be raised from land of the best quality. But a moment's reflection may serve to convince every man that is not led astray by whim or party feelings, that an advice so absurd as that offered by these economists, was never given by men of sound minds; for if their directions on that subject were to be acted upon, some hundreds of thousands of the most industrious and virtuous of our farmers, with their children, servants, and others whom they employ, and who are depending on the cultivation and cropping of inferior land, would all be thrown out of their present employment, and have their courses in life to commence anew; and where, I would ask, could these people find employment or subsistence? not in the cotton factories nor on the loom, for these are already overstocked with hands; and no poor-rates that could be raised could keep so many people alive, or carry them over the Atlantic.

Every person capable of ordinary reflection must see, that if the cultivation and cropping of inferior land, and that of a medium quality (which comprehend more than two-third parts of all the arable land), were to be abandoned, *that* land could be occupied with nothing but a sheep stock, or with cows of the worst description. Dairy cows, or those of an improved breed, and horses, cannot be supported without fodder in winter and spring; and that cannot be raised from such land, unless it is manured and cropped as at present. We might get a precarious supply of grain from the Baltic, and some butter and cheese from Holland, but we could not procure milk without keeping a dairy stock. We could not grow potatoes without dung, or have dung without straw, or straw without cultivating and cropping the land. If the land in question were turned into sheep-walks, a shepherd and his dog might manage all the land that now gives employment and support to thirty or forty families; while the herbage would, after seven years or so, decline in value, and ultimately be covered with moss, which would reduce the rent so as to ruin the proprietors, and of course deprive the manufacturer and merchant of their best and surest customers. In a word, the abandonment of inferior land seems to me to savour more of bedlam, than even the ravings of the late Mr Cobbett against the use of potatoes, which exposed him to so much ridicule.

The clamour raised by the economists, and so loudly reiterated by town and village demagogues, against the corn-laws, as necessary to protect agriculture, and induce the farmers to improve the soil, displays great ignorance and want of patriotism; for it is very uncertain if we could find anywhere grain to the extent we would need if their advice were followed. But if we could procure the grain, the price, which has always been paid in specie, or bills on London, would soon drain the precious metals from Britain, and place her in the mercy of foreign states, not only as to price, but they might enact something like the Berlin and Milan decrees, or Jonathan's non-intercourse act, and thereby compel us, in the hour of necessity, to sell our birthright and best interests for a mess of pottage.

That we may easily raise, to great advantage, from our own soil, all the grain, roots, &c. necessary for even a greatly increased population, must be evident to every one who has paid due attention to that subject; and which I shall endeavour to shew in a few short paragraphs.

It has been ascertained, by Parliamentary inquiries, that, on an average of twenty years, the grain raised from our own soil has fallen short of national supply, to the extent of *four weeks consumpt* every year; or, in other words, our grain falls short *one-thirteenth part* of what is required to supply the population. But if we could so improve the soil as to make it yield one quarter in addition to every twelve quarters now raised, we would become independent of the foreign market for all the necessaries of life, that our soil and climate are capable of producing. And surely no man at all conversant in husbandry can doubt, that it would be easy to raise far more than would supply that deficiency.

Every person who has reached the age of fifty years, and that has paid the least attention to the progress of agriculture, will admit, that the produce of land has been far more than doubled within that period; and every intelligent farmer will also admit, that our arable land is capable of producing double its present produce in the course of twenty years. If so, we certainly err greatly in purchasing, in a foreign market, any part of the grain we need.

But besides what might be raised to advantage from the land now under cultivation, it is well known that we have in Britain and Ireland several millions of acres of waste land that are capable of being rendered profitably productive of much grain, roots, and rich herbage, but which are still neglected. I need not point out such land, as it abounds in almost every rural district in the three kingdoms. It is therefore surprising that when we have such treasures in every county, and so many people complaining for want of employment, and going to America to find it, that we should allow our waste land to remain *in statu quo*, and send our money to foreign markets for the grain such land would produce, and the cultivation of which would give bread to many people, mend the climate, and enrich the proprietors. A reasonable attention to this subject would more become our Legislators, than the party squabbles they have been so much engaged in for some years past.

Fortunately the possibility of reclaiming waste land to advantage, is no longer merely a matter of opinion, but has in many instances been carried into effect with profit. I could easily point out many instances of successful cultivation of such land, but shall at present only mention a few cases of spirited exertions, that I have lately witnessed on the borders of the counties of Peebles and Lanark, where the land is from 700 to 800 feet of altitude, and from whence coal and lime are rather distant.

A very spirited and well-arranged improvement of waste land has been begun on the muirish part of the farm of South Slipperfield, in the parish of West-Linton, by Mr William Forbes, advocate, under the direction of Mr Alexander Goldie, W. S., Edinburgh. The land there selected for improvement extends to 1000 acres, which had been till now occupied as a sheep-walk, and into which neither spade nor plough had ever entered. The native soil is dry and sandy, but covered with a thin stratum of moss, and which is deeper where the ground is level and moisture detained; the whole yielding much heath and coarse herbage, but stly so smooth on the surface, and the acclivity so moderate, easily to admit of being ploughed. This muir has been laid into five farms, of about 150 acres each, with two cottage tlements of about 10 acres each; and above 150 acres have n formed into broad belts of planting between the farms, and se well inclosed with substantial stone-fences. Four excellent l suitable steadings and a cottage have been built on the four ns already let, and excellent roads have been made to each. e proprietor makes subdivision fences when required, on the ants laying down the stones, and pays the price at the kiln 25 bolls of lime to each acre of the land. The tenants pay rent for the first three years of their leases, and only the in- st of the proprietor's outlay on the farm (say L. 18 or L. 20 ) for the fourth and fifth years; and a rent which may rage about 7s. 6d. per acre, from that to the end of the leases of teen years. But each tenant is bound to break up and crop acres every year, till he go over the whole land he occupies. ee of the tenants and the cottager, who are only in the first of their respective leases, have each a few acres in crop; where they had limed the land, and given it two plough- , their oats are medium crops, of six or seven bolls per acre; where the land was not limed and twice ploughed, the seed will not be reaped. One tenant had obtained leave from predecessor to lime, plough, and sow two acres the spring ious to his entry, and his first crop on these two acres yield- im 12 bolls of oatmeal; and his crop of this year, now reap- 16th September 1835), extends to eighteen acres, one-half of h will average six bolls, and the other half nine or ten bolls acre. All these tenants have excellent crops of potatoes and ips. One of the five farms is retained by the proprietor.

s the highest rent offered for the whole 1000 acres, to be pied as a store-farm, was only L. 80 per annum; as all the ovements executed by the proprietor will not cost more than 000; and as the whole land will (if rates do not vary from they are now) yield from 10s. to 15s. per acre of rent, the expiry of the present leases, besides 200 acres of plant- the improvement cannot fail to be profitable; while the re- on of having turned a desert into a fruitful field, ornament- district, and improved its climate, given employment to many people at first, and to several families permanently, must yield the learned proprietor lasting satisfaction.

Another interesting improvement was a few years ago made by the late Sir Charles Lockhart of Lee, and Mr Charles Cunningham of Newholm, near Dunsyre, which falls to be described. The water of Medwyn, having a very irregular course through an extensive haugh, had rendered it a marsh so much overflowed with water in winter, that it was of very little value, and some places of it could not be gone through with safety. But by opening a proper channel for the water for nearly four miles, the whole haugh has been, or can now, by making a few side-cuts, be rendered dry, and capable of being cultivated with ease, and to great advantage. Some of the occupiers of part of that haugh have not, it is true, from their leases being near an end, proceeded in bringing part of the haugh into crop. But Mr Cunningham has brought his part of it (about forty acres) into a state of complete improvement, and rendered it productive of the very best of all sorts of grain crops, roots, and grass. And Mr Hamilton in Boreland has, during this and last year, broke up about fifty acres of the same haugh, and it has yielded him luxuriant returns of oats. He is preparing to break up twenty acres more next year; and some other tenants are beginning to follow his example. The haugh altogether extends to between three and four hundred acres; and what has already been cropped, has yielded ten times the produce it did formerly.

Mr John Allan Woddrop of Ellsrickle has, on his estate of Garvald, in the parish of Linton, converted several fields of marshy land into dry ground, from which he is reaping crops of oats, barley, hay, potatoes, and turnip, all of the best quality.

Mr Daniel Brown, one of Mr Woddrop's tenants, has, within the last five years, broken up about sixty acres of waste land, part of which had been formerly cropped, but had since been allowed to become wild, and part of it is new land, and he has reaped excellent crops of grain and roots from every part of what he has broken up.

Mr William Bowie, in a new farm in that neighbourhood, the property of Mr Richard Mackenzie of Dolphinton, has begun to break up some fields of waste land, from which he is reaping valuable crops. Some others of Mr Mackenzie's tenants have improved, and are now improving, patches of waste land, which has amply repaid their labour, as well as ornamented and enriched that estate.

Mr David Brown, in Easton of Dunsyre, is now reaping an excellent crop of oats from about forty acres of waste land, that had either never come under the plough, or that had been neglected for about fifty years, and had become waste, yielding little but heath.

These spirited and generally successful improvements, all situated near to each other, and near to the extensive improvements on the estate of Sir Thomas Carmichael of Skirling, those of Mr William Aitchison of Boreland, and others, afford altogether an agreeable specimen of the culture of waste land, which, if persevered in as begun, will soon render large tracts of bleak and poor lands productive of the food of man, and ornaments of the district in which they are situated, as well as serve to stimulate other proprietors of such waste lands to fulfil a duty to themselves and to the nation, by turning deserts into productive soil.

---

## THOUGHTS ON THE EXTENSION OF DRAINING.

There is perhaps no circumstance which so obtrusively forces itself on the attention of the agriculturist as he travels along the highways of Scotland as the neglect of draining. In arable as well as in pastoral districts, among mountains as well as on the plains, this neglect is very striking. Many a field under the plough presents dark spots or blotches on the face of its acclivities, or still darker bands and patches on its more level parts; and many more fields in pasture show unequivocal symptoms of hidden water by the growth of semi-aquatic plants which variegate their surfaces in lines and clumps. Perhaps it would be too strong to assert that there is not a thoroughly drained *farm* in all Scotland, but there is no hazard in the assertion that a thoroughly drained *parish* does not exist in it. Startling as this intelligence must be to the agriculturists of England and Ireland who have long been accustomed to hear the husbandry of Scotland lauded as the most perfect system of agriculture in the world, it is no news to many farmers in Scotland. Full well they know that much improvement has yet to be effected by draining, and that in *its* train alone follows every other improvement. Far be it from our intention to depreciate Scottish agriculture. It *is* the most perfect system in existence. And *it* has *made* Scotland to be admired and envied by the world. Much of this perfection and state of admiration and envy in which Scotland is held must be attributed to draining, partial as it has been. Though silent and secret in its operations, like wholesome medicine, draining has renovated the constitution of the soil, and suffused a healthful bloom over the face of the country. But since partial draining has effected such great and pleasing effects, what may not be expected for Scotland from thorough draining! The humidity and variability of the climate, operating upon the inferior soil which occupies a large surface of this country, must always render draining a desirable improvement. Indeed, with these pre-existing evils, it is difficult to conceive that period when draining should be overdone in Scotland. It is probably impossible, even by draining, entirely to counteract the effects of these never ceasing evils, but it is not impossible to ameliorate a humid climate and a bad soil by judicious draining. With draining, as hitherto executed, the climate is much drier and milder than it was half a century ago. Agues and miasmata are diseases now unknown to our rural population. The recent mildness of the winters, the absence of frosts and snows of long duration, and the presence of hibernal vegetation, indicate less ability in the soil to emit those dank exhalations which return in rain and snow from the atmosphere in its changeful flittings over our narrow island. This theory is at least as philosophical as the ascription of our gentle winters to the abruption of the polar ice. Those vast fields and mountains of ice may no doubt affect our climate generally with their frigid influence, and, if that influence is commanding, it should be strongly felt in the ensuing winter, for the whale ships have this summer been unable to penetrate their barriers. But changes of climate are often partial, as may be witnessed in situations which are exposed to or sheltered from particular aspects. There is therefore no unreasonableness in ascribing even a general change of climate to extended and simultaneous ameliorations of soil over a whole country. Were draining extended to its utmost pitch of ability, it is impossible to anticipate the exact degree of favourable change which the climate would experience; although the obvious connexion existing between the climate and the soil, would warrant the anticipation of an important change. But which of them possesses a prevailing influence? The climate certainly influences the soil. The humid climate of Scotland renders the soil humid. And the dry climate of Egypt doubtless renders its soil dry. But is the influence reciprocal? The influence in this case as cause and effect is not so obvious. But, at least, does not a dry soil produce a less humid climate? We say so, and the general belief so tends. May not the excess in drought of the Egyptian soil and of the great sandy deserts in Africa prevent rain falling in those countries? We say so, and the fact can be scientifically explained. No farther proof, then, is required to induce to the belief, that were draining prosecuted till the soil of Scotland were rendered dry, the climate of Scotland would be less humid by the change. At least this much may be safely asserted, that effectual draining would render a humid climate less noxious to every kind of crop; and such degree of security ought to be a sufficient inducement to drain extensively and effectually. But an examination into the manner that humidity affects the soil, will enable us to ascertain how draining first ameliorates the soil and then the climate.

When rain falls on the ground, part of it runs off into ditches and thence into rivers; but the greater part is absorbed. Plants consume much of this absorbed water; some of it descends into the bowels of the earth, and some only as far as the superior strata of alluvium and rock, by which it is repulsed to a lower level, where it afterwards finds its way to the air in springs through the cultivated soil, and thence into rivers; but a greater proportion of it only descends as far as the subsoil, which, if impervious, retains it. That which makes its appearance in springs is generally easily led away in drains made for the purpose. Much skill and capital have been expended in this species of draining in this country. The benefits are, that few *springs* are now to be seen in cultivated land, and it is likely those benefits will be permanent. What flows into rivers is ready to be evaporated again into the atmosphere from the ocean, and returned to the earth in rain; but that which is retained under the soil on impervious layers of earth remains to effect incalculable mischief. While hidden water remains, manure, whether putrescent or caustic, can impart no fertility to the soil; the plough, the harrow, and even the roller, cannot pulverize it into a fine mould; the grass can contain no nutriment for live stock, as the finer sorts disappear, and their places are usurped by coarse aquatic plants; the stock can never receive a hearty meal of grass or straw from land in such a state; they are always hungry and dissatisfied, and of course remain in low condition; the trees acquire a hard bark, stiffened branches, and soon become the prey of innumerable parasites; the roads in the neighbourhood are constantly soft and rutted; the ditches and furrows are either plashy or like a sponge full of water,—suitable receptacles for the newt and the frog; the circumambient air is always damp and chilly, and from early autumn to late in spring the raw hoar-frost meets the face like a wet cloth morning and evening; in winter the frost incrusts every furrow and plant with ice, not strong enough to bear one's weight, but just weak enough to give way to every step, while the snow lies lurking in crevices behind the sun till late in spring,—fit feeding ground of the woodcock and snipe; and in summer musquitoes, green flies, midges, gnats, and gadflies torment the cattle, the labourer and his horses from morning to night, whilst the sheep get scalded heads and eaten up by maggots during the hot blinks of sunshine. Would that this were an exaggerated picture! It may be seen in part, if not in whole, in every parish in Scotland. Look into the mountainous region of the Highlands, into the extensive sheep walks of the Lowlands, into the Lammermuirs, Pentlands, Ochils, Campsies, and Sidlaws, nay, into the cultivated plains of every county, and part of this picture will somewhere present itself to the view. Look into every one of the counties of Scotland, and see the many thousands of acres which require draining on every hand, and which are lying in the *dead thraw* for want of it. Even in the choicest spots—for the richest portions are but spots in size in this favoured land—favoured by Providence in the industry, skill, and prudence of its inhabitants—draining would act as a charm. The Carse of Gowrie is flooded with surface water in winter, and so is Berwickshire; and in East Lothian, which contains a great proportion of naturally dry and rich soils, the stronger land will scarcely grow red clover for want of draining. The lands lying on both sides of all the roads leading from Edinburgh to Glasgow, to Ayr, to Dumfries, to Kelso, to Perth, require extensive draining. In a word, we repeat, that the eye cannot be turned round in any direction without falling upon land that would be greatly improved in fertility by effectual draining. This sweeping accusation could be easily substantiated by many particular references; and its vindication rests on the incalculable loss which agriculturists incur by neglecting thorough draining.

After reflecting on these statements, it will be acknowledged that draining has not been prosecuted in this country even to the extent which it might be, and far less to the extent that would amply repay its cost. The cost would no doubt be considerable, but if it were executed in a substantial manner, we maintain that the increase to the first crop would repay the whole expense to the farmer, be that what it may. But the tenant ought not, in justice, to bear the whole expense of such a fundamental improvement of the land. The landlord should at least share alike with him, and lessen the burden to each.

The kind of draining which would be most effectual, is not difficult to choose. The greatest obstacle to fertility, is the stagnant water spread extensively upon a retentive subsoil; and the only kind of draining which is efficacious for its removal, is not the very deep and distantly placed drains, which are admirably suited to the removal of springs or *spouts*, as they are called, whether superficial or deeply hidden, but the more shallow drain frequently repeated, for *deep drains at considerable distances cannot draw water at those distances from impervious subsoils*. The depth and the distances between the drains, depend entirely on the impermeability of the subsoil. But it is easy to fix the *minimum* depth. No kind of drain, on any pretext, ought to have a *smaller depth of stones than eighteen inches*, nor a *smaller depth of earth above them than one foot*, so that *no drain should be less than thirty inches in depth*, nor need the *maximum* of shallow drains exceed *three feet*. The width should allow a man to work freely in them. The distance between the drains has been fixed at the breadth of a ridge, that is, in every furrow. Where broad ridges are used in clay land, such as in the Carse of Gowrie, the distance is often too great to do much good. Where it does not exceed fifteen or eighteen feet, according to the tenacity of the subsoil, the distances may be considered proper. Much has been urged in favour of making the drains up and down the declivity. We confess we see no particular charm in the perpendicular position, on the contrary, we see many objections to it. We hold it to be a maxim in draining, that rapid descents of water in drains is incompatible with the maintenance of good workmanship. Water descending rapidly any where gutters the ground, and so it will in any drain. Besides, the perpendicular position is not the most favourable for intercepting the water in its descent; because it is very rare that a declivity presents only one declination, it is almost always attended with two, one up and down, and another from side to side, in the horizontal direction. Down such a declivity the water will take a diagonal direction, guided by the degree of the lateral declination. Now, it is as obvious as any demonstration in dynamics, that drains placed in parallel lines declining down the face of a declivity, having a twofold declination, that is diagonally, will afford a much more easy passage for a current of water, than any other direction. The more easy the egress of the water, the more gently will it run away, and the more effectually will it dry the land. The only reason for placing drains up and down is, that the furrows are so placed; but it would be better to make the ridge run diagonally, than allow water to run quickly in a drain in a perpendicular direction. Small round stones, or broken stones, should in very case be preferred to tiles, and they should be carefully placed y the hand. It is only where stones cannot be obtained, but at reat labour and expense, that tiles should be used. Many tiles hich we have seen in this country, are not trust-worthy. They re either too much or too little burnt. We have seen a night's rost break the whole tiles laid down for a drain. Luckily they ere broken before they were used; but why are such spongy tiles old to deceive the public? There is no doubt that many drains ave already been formed with such tiles, for the disposal of which, he tile-maker ought to be amerced in heavy damages. Good-tiles will last for ages. Tiles have been taken up in Lincolnshire whose age is unknown. Tiles should never be laid in clay land without soles, for in time they will assuredly sink into it. Stones should, if possible to be obtained, be always placed above tiles to retain them in their places, and the remainder of the drain filled with stones, dried peats, gravel, or such like porous substance, especially in clay land, otherwise the clay will bind over the tiles in a few years.

This species of draining possesses the advantage of being applicable to every kind of soil; and it will certainly relieve any soil which is afflicted with stagnant surface water. If generally practised, it would effectually drain the whole country, and remove the chief obstacle that exists to perfect fertility of the soil. Were the soil thus fertilised, the produce of the country, whether in corn, straw, green crops, or pasturage, would be increased manyfold. Wheat and live-stock would then be so abundant, and of course cheap, that every labourer would be enabled to consume wheaten-bread and butcher-meat; and constant employment be provided for agricultural labourers for many years. Nor is such a national scheme of improvement chimerical. Many proprietors possess the means, many farmers have yet the means of accomplishing it on their estates and farms, and those who have not, should be assisted by the state. Much public money, it is feared, is thrown away on doubtful expediencies, and much applied to pernicious purposes, which, if employed in draining the land, would increase its resources beyond credibility. One sheep additional kept, or one quarter of corn more raised, on an acre, would add millions a year to the wealth of the country.

---

## ON THE PROPAGATION OF ROT IN SHEEP.

By Mr Edward King, Steam Carriage Station, Hammersmith, London.

In the *Mechanics' Magazine* for August 15. 1835, No 627, vol. xxiii. p. 383, the subject "On Furrow Tile-Draining," I read as follows:—"There is an able article on the rot in sheep in the last *Quarterly Journal of Agriculture*, wherein it is remarked, that to prevent the rot is better than to cure, but there is not a word about furrow tile-draining as a preventive." I admit the value of the adage, "to prevent a disease is better than to cure it;" and I would like to add another—"a knowledge of a disease is half its cure." On reading the above passage, I was induced to possess myself of the *Quarterly Journal of Agriculture* for June last, No. xxix; and at page 117, I found certainly a highly interesting article "On Rot in Sheep," by F. B., containing comments upon, and quotations from, a prior article "On Water Meadows causing Rot in Sheep," in vol. v. p. 503.

Whoever reflects upon the annual loss of stock by this destructive malady, will readily admit the importance of meeting this evil in the most philosophical and practical spirit possible, with a view both to its prevention and cure. At present, I fear, its cure must be despaired of; an accumulation of facts, however, may, in time, put the cure of rot in our power. The prevention of rot is evidently more within the sphere of well-placed hope. The mode of communication of the disease, from an unsound flock to a sound one, seems to be the first point requiring elucidation.

F. B. takes a philosophical view of the subject, and very appositely adduces the mode of propagation of the bott-fly; of which the ova or eggs are deposited by the parent upon the hairs of the horse (where these eggs are called nits), in such situations as will enable that animal to *nab* them with his teeth on the slightest titillation. By this contrivance the eggs become mixed up with the saliva of the horse, and are swallowed with it. In the alimentary canal of the horse, these eggs advance to the state of botts, and attach themselves to the insensible coat of the stomach of that animal. These are ultimately expelled with its dung, whence they emerge as the bott-fly. When one has discarded the ancient notion of spontaneous generation, it is quite in character to examine the mode of propagation of the bott-fly as illustrative of the more ambiguous—the more round-a-bout—mode of propagation of the fluke or flock. The bott-fly history, however, has not been yet satisfactorily ascertained; but to ascertain the mode of propagation of the *Fasciola Hepatica*, or fluke, has been the subject of some experiments by myself, made with the direct object of enabling the shepherd to protect his flock from the disease called "Rot." These experiments, how satisfactory soever they may be, as far as they have gone, have not been quite so complete as I intended they should be; but circumstances have hindered, and may continue to hinder, the completion of them, and meanwhile sheep die, and shepherds suffer loss. Whilst the subject is upon the carpet, therefore, I think it my duty to submit the results of my labours, for I consider my efforts not quite thrown away in their present imperfect state. In so doing, if I should superinduce a right mode of investigation, one grand object will be gained. If I differ a little from F. B. in the terms I use, I trust he will not consider me invidious; I simply tender a helping hand in the investigation.

Before I was born it had been ascertained that the fluke is of both sexes, or double sexed; or each individual is both male and female, like slugs, snails, worms, &c. Each individual, therefore, deposites eggs; of which I have collected many millions in the following manner:—

In the month of April, May, or June, obtain the whole abdominal viscera of the diseased sheep. In the first place, with a bit of good stout thread, tie the *ductus communis*, or pipe of the gall-bladder, as nearly as possible to the duodenum, or the gut into which the gall is emptied. The opening of the pipe of the gall-bladder will be found along the gut about eleven or twelve fingers' breadth below the pylorus, or the opening of the stomach into the gut. Having secured the pipe of the gall-bladder by ligature, next dissect out the liver, without wounding its substance, from the rest of the viscera—wash it, and place it in a clean hand-basin.

The flukes and their eggs are never in the "arteries" or veins of the liver—they are always in the gall-bladder, and the larger biliary tubes of the liver. F. B. in using the term "arteries," means, I must presume, a vessel carrying a fluid; but in this instance the fluid is bile or gall, and not arterial or aërated blood. Perhaps it may be useful to premise as follows: Biliary pores and biliary ducts traverse all parts of the liver, and empty themselves into larger trunks called *ductus hepaticus* and *ductus cysticus*; which pour the bile into the gall-bladder by a route that would seem complicated if it were stated. Out of the gall-bladder the gall passes through the pipe, the ductus communis choledochus, into the duodenum, the first small intestine, —at about the distance of twelve fingers' breadth below the opening of the stomach called the pylorus. It is in the gall-bladder, in the choledoch, cystic, and hepatic ducts, in all the larger biliary tubes of the liver, that flukes and their eggs are found; but in even the vena porta, which carry venous blood, returning from the intestines in a state ready to yield bile, they are not found; nor in any of the arteries or veins of the liver.

Having the detached, clean-washed liver of a diseased sheep in a hand-basin, with a pair of scissors slit up the gall-bladder, and the large biliary tubes of the liver; and collect their contents, consisting of gall, flukes, and eggs, in a large clean tumbler. The inside of the gall-bladder, especially near to the pipe, where eggs abound, may be slightly scraped; and the bilious mucus thus collected, abounding in eggs, may be added to the other collection in the tumbler. To the collection add very pure pump water, in which the flukes may be viewed, then taken out and thrown away. Any floating mucus, or any foreign substance that accident may have introduced, may also be taken out and thrown away. There will now be left in the glass a solution gall, containing hundreds and thousands of flukes' eggs.

If this solution be sufficiently diluted with clean water, the soundest and most perfect eggs will settle to the bottom: this phenomenon will be best perceived in an ale glass tapering to a point at the bottom; upon the sloping sides of which the eggs will settle, and whence they may be caused to roll down over one another to the bottom, by any slight jar given to the glass on its outside. To the unassisted eye, these eggs appear to be fine, regular shaped, equal sized grains of reddish sand. At the surface of the solution, especially near the sides of the glass, hang multitudes of eggs also; but these floating eggs are mostly ill-shaped, some probably in an advanced state towards maturity, or ready to hatch, some evidently ruptured, and probably many addled.

If to collect sound eggs be the object, pour away, with a steady hand, the bulk of the fluid, leaving about one tenth, with the undisturbed eggs, at the bottom. To the remains add a fresh quantity of clean water, by which the eggs will be cleaner washed, and their reddishness refreshed. After the eggs shall again have settled, the bulk of the water may be again poured steadily off, and the remainder, containing the eggs, poured upon a paper filter, through which the water will drain away, leaving plenty of eggs upon the paper. In this manner I have collected a thimbleful of eggs from the liver of one sheep.

The perfect egg of the fluke, seen through a tolerable microscope, resembles more that of the duck than that of the hen; it is less pointed, at the lesser end, than that of the hen. As far as I could judge upon measuring with an insufficient micrometer, the shorter diameter of these eggs is about a three-hundredth of an inch, the longer diameter about a two-hundredth of an inch.

The experimentalist should make himself very well acquainted with the character and appearances of these eggs; so that he shall be able to recognise them wherever he may find them. All his labours will be unscientific and unsatisfactory, until this trifling difficulty shall have been overcome; whence arises my solicitude to enable him easily to collect plenty of sound eggs for the use of his object-glasses. By assiduously cultivating his acquaintance with these eggs, apparently very insignificant particles, he may justly hope ultimately to save millions of heads of sheep, millions of fleeces, and many thousands of pounds to the revenues of his country; these tiny eggs lose their insignificancy under this reflection. The importance of these minute ova will be enhanced in the mind of the philosophical herdsman, in proportion to the attention he may think right to bestow upon the following and similar views.

1*st*, If we can discover thousands of flukes' eggs, hatching or giving out a young fluke, in the gall of a sheep already diseased, but whilst feeding upon perfectly sound pasture, we shall be sure then that thousands of these eggs hatch in the liver of a diseased sheep, without first passing off with the bile by the intestines. Hence we shall see that if, by any chance, a previously sound sheep become infested with only two flukes, each being both male and female, and abundantly prolific, its liver will, in the course of a season, become thronged with myriads of these vile inhabitants.

2*dly*, If we can discover thousands of these eggs floating through the ductus communis choledochus with the bile of the animal, and find them commingling uninjured with the excrementitious contents of the intestines from the duodenum to the rectum, and find them again quite sound and healthy in the droppings of an unsound flock every where, so that the least modicum of excrement, whether it be *bumbly* or *quiltery*, that can be taken up upon the point of a knife, and spread upon the object-glass of a microscope, will afford several sound eggs, we shall then become aware how abundantly they must be scattered over the surface of all sheep pastures grazed by an unsound flock. We must cease to wonder that so many sheep die of rot: the miracle is, that every sheep does not die of it. We may rest assured that nature or providence has contrived some wholesale mode of destruction of these eggs: without such contrivance (which we must discover and imitate), not a head of grass-fed sheep would be to be found in Britain this day two years.

*3dly*, If we find flukes' eggs disengaged from the excrements of unsound sheep by every dash of hasty rain—if we find them in puddles of water in which such excrement has dissolved—if we find them floating with hasty currents down furrows, ditches, and brooks—if we find them spread over meadows upon which such foul waters ebb—if we find them adherent to herbage in all situations where such waters have rested or formed little eddies, we shall at once see how extensively diffused must be these eggs over those localities called "rotting lands."

*4thly*, If we shall discover these eggs, hatching and hatched in the stomach and duodenum of sheep previously sound, but intentionally taken from sound to unsound pasture prior to slaughter—and if we shall discover the same in previously sound sheep, fed still upon sound food, with which plenty of healthy fluke's eggs have been intentionally commingled, and find the fluke making its way up the gall-vessels of such previously sound sheep, and in every stage of its progress to maturity, we shall be satisfied as to the *modus propagandi* of this disease: we shall perceive how variously this apparently insidious disease may be caught; and cease to wonder at the thousand and one miraculous tales told by herdsmen of "hair-breadth 'scapes" of their flocks on one occasion; and of their being, on some other occasions, affected by eating slugs, snails, dew of grass, &c.

*5thly*, If we shall discover that flukes' eggs, when given intentionally with the food of sound sheep, on some occasions all perish in the stomach of the sheep from some accidental admixture of medicinal herbs with its food, or from some skilful combination of salt, ammonia, soda, muriatic acid, or other medicaments with its food; and if, on the other hand, we discover that in sound sheep similarly treated, but without the addition, by accident or design, of the preservative medicaments, the bulk of the flukes' eggs vivify when once arrived in their nidus, we shall derive valuable data upon which to argue and act, to prevent, if not to cure, the rot.

*6thly*, If we dwell upon the character of the egg, upon its habits of vitality—if we find that desiccation, or warmth without moisture, deprives the egg of plumpness, rotundity, and probably of vitality—if, by such process, eggs become ruptured, flattened, or collapsed, so as to appear more like a boiled pea that has grown cold than a plump egg—if we find that some of the eggs so treated, probably those in which vitality was not quite extinct, become, on the addition of water only, replumped and apparently restored to health, we shall be led to infer that those eggs which are eliminated from sheep's dung by hasty rain, will perish from desiccation, if the soil be porous, sandy, and gravelly, through which the water can filter, leaving the eggs upon the surface; whilst, on the other hand, if the soil be compact loam or clay, through which water cannot easily percolate, but is compelled to find its level upon the surface, these eggs will be rolled and floated by the little currents, and escape desiccation. Hence one will be called sound, and the other unsound land, for sheep pasture. But even sound pasture, whilst fed upon by an unsound flock, may sometimes appear unsound upon an admixture of sound sheep: the splash of a large drop of hasty rain, must necessarily scatter many eggs in several directions, and some of these may fall upon the crown of a grass plant; also temporary puddles in which foul excrement is dissolving may convey eggs into the crown of a grass plant, and these may be pushed up by hasty growth, so as to enable hard fed sheep to nab them with the young blade, before desiccation shall have destroyed their vitality.

*7thly*, If we shall discover that cold frost, as well as desicca tion, destroys the vitality of these eggs, we shall at the same time have ascertained whence ensues the sweetening effect of hoar-frost and hoary winter, to render unsound pasture sound. In short, if we call to mind and dwell upon the habits of vitality, the abundance, &c. of flukes' eggs, we shall cease to wonder at any thing that has ever been stated with an air of mystery in regard to the propagation of the disease called rot: the only mystery is, that we have alive one head of sheep in Britain.

I presume I have now stated enough theoretically to convince the reader, whether he be philosopher, statesman, or herdsman, that the tiny egg of the fluke is a mighty matter, and well worthy of his very intimate acquaintance, if he would set about some scientific inquiry with the view of shewing in what manner best to protect flocks from the rot. Every point above stated theoretically requires, however, to be proved, again and again, by oft repeated scrutinizing examination, so that doubt cannot rest upon, nor the captious raise a quibble against any one datum, before philosophy will admit these points, and permit them to be entered upon her record of facts. I beg now to state the little I have done, which has led me to the above system of theorizing, and the field will be then open to further experiment and inquiry.

I have collected many millions of the eggs of the fluke from the gall-vessels of diseased sheep, in the manner previously described. I put several parcels of these eggs in paper for future examination; and I carried some of them in my waistcoat pocket from Blackthorn, Oxon, the site of my experiments, to London. About two years ago, I delivered one parcel to Mr Carpenter of Regent Street, of whom I bought my microscope, and who, I hoped, would feel enough of interest in the thing to subject them to an examination before his very powerful solar microscope, and invite me to witness that examination; but I failed to create enough of interest in his mind upon the subject. Other parcels were carried in my pocket a few days longer; but, on my return to Blackthorn, where was my microscope, some of these dried eggs were spread upon object-glasses. Of these some appeared to be burst, some were shrivelled, and I concluded had lost their vitality from desiccation; but, on wetting them with a little water, some of these plumped up again; but whether or not their vitality was destroyed, I had no means of proving. I was induced, however, to infer, that desiccation does destroy the vitality of these eggs, and that hence arises the salubrity of sheep pastures on low lands, after they have experienced dry weather for some time. But the point requires better and further proof yet.

I have found healthy eggs in abundance in the intestines of diseased sheep, commingled uninjured by digestion, with their excrementitious contents, and in the mucus scraped from the lining membrane of the intestines, from the duodenum, into the end of which the gall-bladder empties itself all the way to the rectum. These eggs were so abundantly distributed, that any modicum of fæcal matter taken up upon the point of a penknife, and gently spread upon an object-glass, shewed several of these eggs, when touched with half a drop of pure water.

Between the opening of the ductus communis and the pylorus I seldom found eggs; and when I did find any, there were evident signs, in the discoloured character of the contents of the duodenum, that bile had regurgitated, or passed up the duodenum, instead of down it on its natural route.

I have never witnessed the slaughter of previously sound sheep whilst feeding upon unsound pasture; if I did, I should certainly search for eggs that may have been recently taken in with its food; and I should, *a priori*, expect to find some sound, some hatching, and some ruptured, in the stomachs and duodenum. This is an exceedingly important point, that requires patient investigation. To do it effectually, a score or two of sound sheep should be purchased; two or three should be slaughtered to see that they really are sound; they should be then put on rotting land, and a thimbleful of flukes' eggs should be commingled often with the damp grass upon which the sheep feed, so as to ensure their swallowing a plentiful dose of recently collected healthy eggs. Afterwards one or two per week should be slaughtered, and the contents of their stomach, duodenum, and gall-bladder and ducts, very carefully examined. This experiment I have been hindered from instituting, by my steam-carriage pursuits; but others may probably set about them, and without loss; for the mutton of the slaughtered sheep would be improved rather than injured by feeding upon rotting land a little prior to slaughter, especially in April, May, and June, the most suitable period of the year for such experiments.

I have found abundance of plump eggs in the droppings of sheep, over the low lands on both sides of the little river Ray in Oxfordshire; in the parishes of Launton, Blackthorn, Merton, Charlton, &c. on the north side; and in those of Marsh Gibbon (Bucks), Piddington, Arncott, Mircott, &c. on the south side, as well as over all the flats of Otmoor,* through which this river runs, and over which, after much rain, it spreads in flood. The whole of this district is esteemed rotting land, of the first order for mischief. Upon Blackthorn hill, very sound ground as regards sheep, I have found in puddles of water of only temporary duration, but in which sheep droppings had dissolved and were dissolving, plenty of flukes' eggs; and the droppings of the unsound flocks upon the fallows of this hill were that year full of flukes' eggs, the sheep having probably contracted the disease in the adjoining flats; but this hill did not give, and never has given, rot to sound sheep. The soil consists of a reddish loam, mingled with fragments of limestone, and resting upon a substratum of loose limestone rock, which furnishes natural under-drains. The rains, except those tremendously hasty rains, which occur seldom, soak into and filter through the soil, leaving the flukes' eggs upon the surface to perish,—in summer by desiccation, in winter by time and frost. The water reappears at lower levels, mostly filtered and clear, not carrying one egg.

---

* Such flats as those of Otmoor, and those of the villages drained by the Ray, might be nearly all rendered sound land by a little skill in draining and filling up depressions; and, by the same means, many thousands of acres of unsound land throughout the kingdom might be rendered sound land; and simply by the judicious employment of the superfluous labourers under the new system of Poor Laws, if the *quidnuncs and quibbles* who may have the direction and superintendence of such labour would issue their fiat to that effect. Upon the flats drained by the Ray I have farms, upon which the tenants cannot safely pasture a flock, and off which they cannot get a good crop of wheat without a flock of sheep; and, consequently, I could not propose such a measure in this locality without being suspected, by the shallow radicalism of the day, of having in view the improvement of *only* my own property.

But the ditches of the flat meadows between this hill and the little river Ray, in which the water is nearly stagnant after the produce of the last hasty shower has passed away, and the drains and dykes up which the spring and summer floods ebb from this river, are sure spots for bestowing rot; and the water of these localities must be most abundantly charged with eggs. The advanced, diseased, and imperfect eggs, may be sought upon the top of the water; the sound healthy eggs at the bottom. It is probable that multitudes become lodged in the crowns of grass plants, and are carried up by hasty growth after the subsidence of the water, so that sheep swallow them with the young blade.

Here my inquiry has ceased, for the present at least; but I beg very earnestly to recommend the investigation to others, as a field exceedingly likely to yield a produce beyond the price of gold.

## ON THE CAUSE OF ROT IN SHEEP.

By Mr William Hogg, Shepherd.

For more than half a century I have been engaged in the management of sheep. During that period I have not been inattentive to the misfortunes, the evils, and the ailments to which sheep are liable; and, among the rest, the rot has not a little occupied my attention; and with the greater assurance I can point out its symptoms, its progress, and termination, as I resided a long time on a farm where it was the prevailing disease, and from which, all who were connected with the concern dreaded the greatest annual loss.

Diseases of every kind among sheep, are very often raised or invigorated by improper management, and none is easier brought into existence by harsh treatment than the rot. Hence, in many cases of this disease, it is difficult to determine whether it proceeds from the morbid qualities of the soil, or from some adventitious event in the animal's life. The case first laid down considers it as inherent in the pasture; the causes afterwards noticed, the exciting reasons which immediately bring it into existence.

As distinct families of this animal, for several descents, assume the same shape and figure, in so far as this disease proceeds from a particular formation of the system, it may be reckoned hereditary; but the force and freedom with which the lungs heave, is the surest criterion to determine the absence or presence of this disorder; but still the original or predisposing cause exists in the qualities of the pasture; it is this which marks the peculiarities of the constitution, gives that flow of spirits which actuates the animal, and adjusts every movement in the system.

I lay it down as a position which need not be doubted, that pastures abounding with soft grassy nourishment dispose to this disorder. Grasses of this description spring early, rank and juicy, are eagerly eaten at that season, when all other green herbage is absent; the scarcity of verdure, and its own succulence, induce sheep to eat it very close to the surface; the soil vigorous and strong, pushes constantly forward more of the delicious sward; yet till late in the season, it never attains luxuriance, as the pasturing stock constantly keeps it bare. Other grasses firmer and more consistent in the blade at last arise, but are coarser, and in proportion as they are so they are rejected, and the soft tathy verdure still constitutes the principal part of the food: the animal's taste by degrees is perverted, it can relish no other food than this raw watery sustenance, which imparts no consistence or vigour to the muscular and more essential parts of the body; and all its influence is directed to the increase of the viscera, and every inability arising from constant repletion.

The stomach and bowels increasing to an extraordinary bulk, become an unmanageable weight, too weighty for the constituent parts to carry about with ease, or with that facility necessary to its thriving, and by degrees the animal assumes a bad shape, that is, the belly and hind quarters become heavy and lumpish; the fore quarters low, narrow, and contracted. The lungs are obstructed in their full play, and very often one of their lobes adheres to the ribs; this farther impedes their motion; at every respiration the cells of that master organ are neither sufficiently filled nor emptied; for want of vital air the blood is tainted, every extraneous humour increases, a general debility prevails, and symptoms of the rot appear.

But feeding on raw immature sustenance to such excess, and so constantly as sheep once habituated to it ordinarily do, operates another way for the introduction of this disease; the fluid contained in the unripe food engenders a good deal of serum in the abdomen, and even diffuses it through many parts of the body, and this not being a natural fluid, farther debilitates the constitution. The animal now lounges about on soft tathy spots. Immediately that general waste of body falls into a morbid tumour under the chin; but this is a late symptom. A violent diarrhœa then appears, when the animal dies.

But feeding on such unwholesome grass, to the exclusion of every other kind of food, always confines the animal on such low damp spots as produce it; while at every inspiration plenty of rank miasm is drawn in, which settles in the lungs, and loads their cells with a phlegmy viscid matter, which, with difficulty, is coughed up, especially when the animal is excited to motion. A consumption is then completely formed, for which, as far as I know, or ever observed, there is no cure.

The softness and immaturity of the grasses, upon which the animal feeds, is the predisposing cause to this disorder; but where this is unaided by any accidental cause, though it has for a long while been preparing the system for the reception of this disorder, yet has as yet been unable to give existence to the disease itself, till some exciting cause occurs, which directly fixes it in the constitution; and this exciting cause proceeds either from the severity of the seasons or improper management.

It would be tedious, and in several cases almost impossible, minutely to explain how such a cause operates to produce this disorder; but it must be understood, that a certain degree of force or energy in every sheep's constitution is necessary to keep the functions of life moving in a healthy orderly manner; but when the regular operation of these is any ways impeded, by any cause whatever, the rot on soft tathy pastures is always the consequence. I shall briefly mention those belonging to the first class, viz. unpropitious seasons—heavy and protracted storms of snow—rapid transitions from frost to fresh, and *vice versa.* Hence the old adage,

“ Mony frost an' mony thowe,
Make mony weary rotten ewe.”

Wet seasons, especially wet autumns—immoderate falls of rain, cause drains, cleughs, and burns to overflow their natural boundaries; in such places, the soil never omits to send up a hasty flush of new grass, which is particularly detrimental to the health of the pasturing stock—a new braird of grass rising late in the autumn, or on fat places, even in the month of December. This also has a bad tendency, for it sinks the animal spirits.

The exciting causes of the rot from rude and ungentle usage may be classed as follows:—An immoderate heat, often got by severe dogging; I have several times known the lamb get this improper treatment, yet the constitution struggles on for three or four years, and yields to the rot at last—too long indulgence on flat grassy pasture which has been recently flooded—grazing on land which has been formerly, or is at the time, pastured by cattle. The rank grass of a deep green colour, springing from the spots on which they drop their dung, is vastly deleterious, as is also that kind which rises round the borders of their footmarks, after being soaked with stagnant water. This last cause affects not individuals, but whole parcels; and in general any misfortune or slight disease, which has for a while interrupted the animals thriving on all soft tathy pastures, is almost sure of introducing the rot.

I have read of instances, which were said to be well attested, of sheep rotting very hastily when transferred from their native hills in Scotland to rich English pasture. Except bad usage when taking them up, I can think of no other cause that can satisfy myself for this rapid waste of constitution; but let it always be remembered that a severe heat, which is often accompanied with other base usage, will break up the soundest constitution, especially at that important crisis, when it is removed to a pasture quite different in its qualities from that on which it was bred.

I have only to remark on this part of the subject, that the predisposing cause, by its long and uninterrupted influence, may produce this disorder; but its existence as a disease is oftener begun by the intervention of auxiliary causes.

The seeds of the disease may have struggled with the constitution for some seasons, but when the following external symptoms are exhibited, it is a plain declaration that all the ingredients necessary to constitute the rot are condensed and formed into disease, and that death will immediately ensue. I shall mention them in the order in which they generally appear.

About the latter end of February or beginning of March, the wool loses its healthy brown colour, becomes bleached and deadlike; then follows considerable prostration of strength; late in leaving the tathy spots, and early on them next morning—probably would not leave at all if not urged away by the shepherd; falls always back in the ranks when the shepherd moves them forward; a sullen, lustreless eye, looking steadily at the shepherd; an œdematous swelling under the chin. This last is a late symptom.

When dissected, the internal symptoms are: Lungs entirely wasted, often hanging like empty bladders to the base of the *trachea;* in some cases, when not so much wasted, the interior of each lobe full of tubercles; liver, in all cases that ever I saw, increased to an extraordinary weight and size, studded all over with hard white spots: cut any of its ducts, and the flukeworm issues out by hundreds, immersed in a bilious-like liquor. Several of this insect are also to be seen distributed among the other viscera; but I never saw them within any but the liver. These creatures I consider as the consequence, not the cause, of the rot; for they also exist in the livers of healthy sound sheep. Besides, the *fasciola*, of which this is a variety, is peculiar to the intestines of other animals; but their extraordinary increase, in cases of this kind, is no doubt owing to the diseased state of the liver, in which they multiply to such immense numbers, and their multitude and activity in it diminish the strength, and accelerate the death of the animal. In the quantity of tallow there is not much decrease, not near so much as the extreme debility before death would seem to announce. That which enwraps the stomach and kidneys, as well as the fat dispersed through the system, has lost its suety qualities, and become a tough yellowish-coloured substance, altogether infusible by heat; in some more, in some less, but always a quantity of serum loose in the abdomen, in which the bowels float. Over the carcass are sundry yellowish spots, which are not unfrequent where fat should exist.

Excess of fluid existing in those varieties of grass,[*] which the animal selects for its food, and a deficiency of those firm consistent varieties,[†] which are peculiarly adapted for strengthening the stomach, for animating and establishing the muscular system, I take to be the radical cause of this disorder; yet secondary or exciting causes may operate with such force and vigour as to unhinge the best constitution, and dissolve the best constructed parts, and, when this is done, the rot is always the consequence.

## ON GREENHOUSE PLANTS. NO. III.

By Mr TOWERS, Author of the Domestic Gardener's Manual.

IN continuation of a description of the most approved greenhouse plants, Class v. PENTANDRIA contains all those genera which have five stamens; and these are exceedingly numerous. The class comprises six orders, governed by the number of the pistils. The first order, *Monogynia*, has above three hundred and twenty catalogued genera, and more than two thousand five hundred species; hence the choice is great; but brevity requires that I select only a few plants, pre-eminent in beauty, of ready culture, and that continue in flower for some time. I shall also give the preference to those which have been figured in the *Botanical Magazine* or the *Botanical Register*.

---

[*] Among the kinds of grass which peculiarly dispose to this disease, may be mentioned the several kinds of meadow-grass, woolly soft grass (*Holcus lanatus*); but it must be recollected that those grasses are more or less noxious in proportion to the wetness of the season, or to the frequency with which they have been inundated by water; for this element, in its purest and most simple state, leaves a deleterious deposition in the grasses over which it floats. This is neither a sediment, nor, as far as the human sight can judge, can it be called an impurity. It is a very fine transparent colouring, nearly resembling the cobwebs which float through the air on a fine autumnal day. It was known, as well as its poisonous effects on sheep, to our forefathers, by the name of *Lace*. I have often noticed this sparkling appearance by the sides of wells, whose waters were newly emitted from the interior of the hill; and I once knew of a sheep which habituated itself to such unwholesome food completely rotten at a year and a half old.

[†] That species of feeding which imparts a sufficient flow of spirits to the animal's consistence and activity to those parts adapted for motion, are the different heaths, ling, deer-hair, all the varieties of bent, &c. A due proportion of these, eaten along with soft and often unripe grasses, accelerates the digestion of every day's food, checks the preternatural increase of the viscera, and opposes the generation of vicious humours through the whole system.

PENTANDRIA *Monogynia* indicate that the plants have five stamens, distinct from each other; and one pistil in the centre of the flower.

PLUMBAGO *capensis*, blue-flowering *leadwort* of the Cape of Good Hope, introduced in 1818.—*Bot. Reg.* 117. This genus gives title to the natural order *Plumbagineæ*; it is the only species which can by any means be considered as a greenhouse plant. It is very readily propagated by cuttings of the semi-ripened shoots, placed in a small pot, round the sides; the soil being sandy peat and loam in equal proportions, and the holes filled with fine washed sand. I find that a plant which has flowered freely in the spring, in a pot, will grow in a peaty soil of a border, and flower in the open air in August. The plant will attain to the height of three feet, and bear beautiful terminal loose spires of flowers, in colour between a light lilac and a French grey, with a darker stripe down the centre of each petal; its calyces are clothed with hairs, each bearing a glutinous gland at its tip. It is a lovely and interesting species, and may be kept in flower by frequent propagation, from March to November. It should be kept rather warm in the winter.

HELIOTROPIUM *Peruvianum*, Peruvian turnsole; the term expresses a property which the flower does not appear to possess, for in what way does it turn towards the sun?—one of the popular fallacies. This species belongs to *Boragineæ*, the Boragi, rough-leaved tribe, *Asperifoliæ* of Linnæus. It was introduced about the middle of last century from Peru, and was figured in the *Bot. Mag.* No. 141. Long a favourite in our stoves, where it bore compact heads of whitish flowers, with a purple tinge. It is now a greater favourite, as a parterre flower of the summer, where, in oval or oblong beds, a little elevated above a grass plot, it mats, intertwines, and produces masses of deeper, richly tinted flowers. These are remarkable for the recurved (gyrate) flexure which their heads exhibit, and above all, for the delicious odour of new hay (indicative perhaps of the presence of vegetable prussic acid), which they diffuse. Bees seek the flower almost in a swarm—would the honey be salubrious? It is readily cultivated by cuttings of the young shoots in spring or autumn, in rich mould and sanded holes. Gardeners who "bed out," strike fifty in a pot, in September and October, and keep the plants in frames; but cuttings taken at a joint, three or four inches long, will strike in a few days, in a phial of water, placed in the window of a warm sunny room, or in the gentle bottom heat of a temperate hot-bed; and the plants will move into soil without danger. Rich leaf mould, or very old cow-dung, with one-third of sandy loam, will flower the plant well; it likes water, but caution will be required during winter. Two or three fine plants ought to stand in every greenhouse collection. *Heliotrope* may be said to blow all the year through.

ECHIUM, viper's bugloss;—so named from a Greek word indicative of some fancied resemblance to the reptile. The genus is a family of *Boragineæ*, and furnishes one handsome greenhouse plant.

*Echium grandiflorum*, great pink-flowered *Echium*.—Fig. *Bot. Reg.* 124. It is readily propagated by cuttings, in sandy loam; and, judging from analogy, I should say in *water*, assisted by a temperature of seventy-five degrees. The plant attains to two or three feet, produces fine long pink flowers in tufts at midsummer, and later, and is furnished with rough longish lance-shaped leaves.

It has lately occurred to me to try the effect of water, with or without bottom heat, in striking cuttings of herbaceous plants, or of the very young wood of shrubs. The process is one of great curiosity and convenience, and I strongly recommend it to every one. It is interesting to trace the progress of the roots and rootlets, in a transparent medium, from which the subject can be removed to a pot of soil, without injury to the smallest visible fibre or spongelet. Amazing numbers of plants may thus be easily raised; and what is very gratifying, the water, which with common flower-stalks immersed in it would become unbearably offensive, is, by the *production of roots*, kept sweet for a very long period.

PRIMULA *sinensis*, the Chinese primrose, imported from China in 1820.—*Sweet's Flower Garden*, fig. 196. This lovely novelty presents us with a white as well as pink variety. It succeeds well in pure sandy loam, or loam and fine sand in equal parts; it is rather impatient of water in damp weather. Sometimes the seeds ripen well; they should then be sown as soon as the capsule changes colour, and *that* ought to be taken while greenish, otherwise the seeds may be lost. Sow the seeds in shallow pans, and scarcely cover them with fine soil; when up, thin out the plants to an inch apart, and when three or four leaves are well developed, raise the plants, with earth adhering to the roots, and plant them into the smallest pots, singly; change the pots once or twice, till at length the full grown plant occupy a pot four or five inches in diameter. The greenhouse ought to have six or a dozen of these beauties, which, on account of their well defined shining corollas, and elegantly cut and lobed downy leaves, are one of the greatest ornaments of the declining year. *Primula sinensis* (or *prænitens*) flowers in fact from November to March, and again in the summer.

CYCLAMEN, or sow-bread. One only of the species, and a variety, is a greenhouse plant strictly; but three may with great propriety appear in the greenhouse, viz. *Cyclamen coum*, round-leaved, cos cyclamen, light crimson-purple. *Bot. Mag.* 4.—*Cyclamen hederæfolium*, ivy-leaved (white), native of South Germany. 1596. *Bot. Mag.* 1001.—*Cyclamen persicum*, the Persian white, with a crimson eye, very fragrant, and its variety with scentless flowers. *Cyprus*, introduced 1731.—*Bot. Mag.* 44. Peat and loam, or sandy loam with leaf mould, will suit these plants, which may be cultivated by seed, if that ripen, in the same soil. See a very clear description of the treatment in the *Gardener's Magazine*, vol. 1. p. 386, by Mr Wilmot of Isleworth, with a correct figure. These fine plants flower in March and April. They all rank with *Primulaceæ*.

CHIRONIA furnishes a collection of several very pretty under shrubs, with beautiful brilliant pink or reddish flowers; the contrast produced by the colour of the petals, and the rich yellow of the spirally twisted anthers, is very pleasing. The plants are shy, or liable to go off, but are easily renewed by cuttings in sandy heath mould. The genus is referred to *Gentianæ*.

*Chironia decussata*; leaves in pairs, every pair crossing the pair below it at right angles; is a fine showy plant, figured in the

*Bot. Mag.* 707. It is a native of the Cape. Introduced in 1789; and flowers throughout the summer. Height one to two feet.

IPOMŒA, a magnificent genus of climbers; most of the species are, however, stove plants. It is closely allied to *Convolvulus*, and ranks with *Convolvulaceæ*. The term Ipomœa is derived from two Greek words, indicating a resemblance to the spiral twists or contortions of a worm (Ιψ ἰπὸς).

The plants are propagated by cuttings, under a bell-glass; and grow freely in loam and bog earth. They are furniture for the conservatory, rather than the green-house; however, three may be named:—*Ipomœa dissecta*, cut-leaved, from Georgia, 1813; scarlet, flowers in July; grows ten feet high.—*Ipomœa pendula*, pink; same height; in flower all the summer. *Bot. Rep.* 613.—*Ipomœa mutabilis*, changeable; purple flowered. *Bot. Reg.* 39.

CONVOLVULUS, another genus of *Convolvulaceæ*, (and its type), contains many climbing, and some low herbaceous plants. One species for the greenhouse is the *althæoides*, marsh-mallow-leaved Convolvulus.—Figured in the *Bot. Mag.* 309. Its lower leaves are sinuate, and cut at the edges, but entire; the leaves of the stem are deeply cut into five irregular segments, the middle one much larger than the others. The whole plant is silky, and the flowers of a pale pink or rose colour. It is a native of the Levant, and was introduced in 1597. Sandy loam, or loam and heath mould suit it, and it may be increased by the roots.

EPACRIS *grandiflora.*—Native of New South Wales, introduced in 1808; fig. *Bot. Mag.* 982, and beautifully in Paxton's *New Mag. of Botany*, p. 52. I select this specimen from a lovely family, a genus, and the type of *Epacrideæ*. It resembles heath in the form of its flowers, and is related closely to the heath tribe. Its specific character will give a tolerable idea of its appearance. "Leaves egg-shaped, but ending in a sharp point, very shining. *Corolla*, tube three times the length of the calyx, bright crimson colour, terminating in greenish-yellow, very shining, and hanging from the plant in a very graceful manner." This plant can be pretty readily increased in the spring, by taking cuttings of the extreme tips of the young shoots, and placing them in pure white sand; treating them in every respect as cuttings of the heaths; which will be hereafter a subject of particular inquiry. The growing plants will require sandy heath moulds, good drainage, at the bottoms of the pots (a layer of moss, half an inch thick, will perhaps prove the best drainage in most instances), and a free circulation of air. It grows three feet high, and blows from January to June.

AZALEA. A genus of the natural order *Rhodoracea,* which is eminent for beautiful species; the greater number are hardy, peat plants;* but, recently, several species have been introduced from China, which claim admission into every collection.—*Azalea Indica rubra,* scarlet-flowering. From China in 1808. *Bot. Mag.* 1480.——*Azalea Indica alba,* white-flowering. *Bot. Reg.* 811.——*Azalea pulchra,* fair or lovely Azalea, a hybrid between *Indica* and *ledifolia;* delicate pink below, very large flowers.——*Azalea Danielsiana.* From China; very large, brilliant, serrated or pink flowers, 1830. The two last are figured in Paxton's *Magazine of Botany,* No. 6, July 1834. The directions for the culture of the greenhouse species, in the work just referred to, are judicious. "Pot as soon as they have done flowering (about the end of May), except those intended to be left for seed, which must remain until they have ripened their seed. Use a mixture of equal parts of sandy loam and peat, with a small portion of leaf mould, in preference to all peat; and be careful in potting to give a good drainage of broken potsherds;"—(again, I recommend a trial of pure *moss,* as being elastic, permanent, and a *vegetable substance*);—"for although they delight in moisture, stagnant water proves injurious to them. About the middle of June, place them in a somewhat sheltered and shady situation, out of doors. Allow them to stand in this situation till September, then remove them into a pit or greenhouse, in an airy situation, until they are wanted for flowering." I do not speak practically of the two last most elegant species, but of Indica *rubra* et *alba.* I am certain that peat and sand will suit them, and that, in early spring, the heat of a stove will assist their growth materially. I have kept a plant of each in a pine-stove, where the temperature in bright sunny days has been 90°, falling to 60° at night; and my plants are now in the open air. In the former situation they were not drawn; in the latter they are in perfect health. Both the former species, and perhaps the two latter, may be propagated with skilful management by cuttings; but layers, of low situated shoots, in their own pots, surrounding the part layered with silver sand, and bringing the flexures into close contact with the side of the pot, are more likely to be successful. Patience will be required, but the beauty of the subject will reward all that care and assiduity can bestow.

---

* Some of the *Rhodoraceæ* in Upper Canada grow with great luxuriance on sandy soil; a fact, we suspect, not generally known in this country.—EDITOR.

Nerium *Oleander*. A beautiful genus, with varieties of single and double flowers, pink and white, which appear about May or October. These plants strike freely in water or soil: the latter should be rich loam and leaf mould, the cuttings inserted in sanded holes. They will succeed in the autumn, if placed in the heat of 60° or 65°; and by this means fine flowering plants, not higher than twelve inches, may sometimes be obtained, by taking a short cutting with the germ of the flowers already formed. The trees are natives of the south of Europe. The single pink and white were known in 1596. *Nerium splendens*, double-flowered pink, (1814). *Bot. Cab.* 666. ——*Nerium odorum*, sweet-scented; two varieties, viz. *Nerium odorum*, flesh-coloured. From East Indies, 1683.—*Nerium odorum plenum*, double-flowered. *Idem*; *Bot. Reg.* 74.—These natives of the East flower best in a stove; but they will live in the open air. When in flower, the pots ought to be kept in a pan of water.

Roella *ciliata*, ciliated or fringed-leaved Roella, a genus of *Campanulaceæ*, bears a charming blue and purplish cup-shaped flower, at the summit of each slender stalk. It has delicate linear leaves: the plant is a native of the Cape; is easily propagated in sandy peat, and increases by the roots. It grows about a foot high, and flowers during the summer. *Bot. Mag.* 378.

Gardenia *florida*, or Cape Jasmin; *Gardenia radicans*, smaller or rooting Gardenia; *Gardenia rothmannia*, spotted-flowered Gardenia. These belong to *Rubiaceæ*, and are readily increased by cuttings, in sandy loam, with sanded holes, assisted by a very moist heat. The first and second are natives of China, figured in *Bot. Reg.* 73 and 449. The blossoms are white, exceedingly fragrant at night, but not durable. The last is marked with yellow: it produces berries of a large size and irregular shape: it is a native of the East Indies. *Gardenia florida* is by far the most elegant of the genus: if kept free from *coccus*, or mealy insect, its leaves are bright as a mirror, and its terminal flowers velvetty, and of a large size. Loam and peat suit it, but a moist heat in the early spring is generally required to produce abundance of flowers. I have kept a fine bushy plant, not a foot high, in the stove all summer, giving water pretty freely. It grew but slowly till August, then shot up several inches, and formed flower-buds. These, during the present season, have successively expanded; the flowers have been of a very large size, and others will open, I doubt not, during the autumn.

Diosma is a member of a graceful family, formerly from the Cape of Good Hope, the members of which were once united under this name; but these, from a slight botanical distinction, have been divided into several branches or genera. They belong to *Rutacea*, and may be treated alike. The plants will strike pretty freely in fine sand, under a bell-glass, if treated as heath, and will grow in sandy, black heath soil. The species of *Diosma* which merit attention are:—*Diosma oppositifolia*, opposite-leaved Diosma, *white;* flowering between March and June: introduced in 1752. It is a tall species, from two to three feet. ——*Diosma ericoides*, heath-leaved Diosma, *white;* 1756. *Bot. Mag.* 2332; two feet high. March and April.——*Diosma hirsuta*, hairy-leaved pink Diosma, 1731; three or four feet. Blows all the spring. The term *Diosma* is said to be derived from two Greek words implying an odour worthy of the gods (divine). Now, the odour is not altogether divine, nor ought we to conjecture that the deities of *Olympus* (for Δὶς Διὸς is translated *Jupiter*) were personages of vitiated taste. I conceive that Δια, and not Δις, and οσμη, constitute the derivation of the term, and indicate a substance *embued* with odour, *throughout* which a scent, bad or good, is diffused. The word thus derived will express the qualities of some of the species.

Adenandra, so styled from the glandular appendages to the stamens, contains some of those plants which, under the original title *Diosma*, were so much admired, and others of more recent introduction. *Adenandra uniflora*, one-flowered Adenandra; blossoms at the top of each branch; white, pinkish; 1775. Grows one foot high. *Bot. Mag.* 273.——*Adenandra amœna*, pleasing or beautiful; whitish flowers, with a pink stripe on the petals; several on the apex of the branches, which rise 18 inches or 2 feet high. *Bot. Reg.* 553; 1798.——*Adenandra umbellata*, umbellate, two feet, flowers in terminal umbels, pink, showy.——*Adenandra speciosa*, showy; 1789 or 1790. *Bot. Mag.* 1271: 1 var. with many flowers; 2 var. with few flowers. All grow to two feet, and bear pink blossoms.—These species of Adenandra flower in spring and early summer. *Amœna* I have known to expand one or two blossoms daily, from mid-March to midsummer nearly; and sometimes fourteen blossoms have been open on a small plant.

Baryosma. The term *Barys* expresses weight, a heaviness or fulness of odour.——*Baryosma serratifolia*, saw-leaved; grows three feet high; flowers pink: it is of a habit resembling Diosma. *Bot. Mag.* 456.——*Baryosma odorata*, formerly *Diosma odorata*, sweet-scented, with white flowers; anno 1824.

Agathosma, with good or grateful odour. *Agathosma pulchella*, pretty or fair, purple; grows to two or three feet; in flower throughout spring and summer. *Bot. Mag.* 1357.——*Agathosma hispida*, rough-leaved Agathosma; blue; flowers in July and August; introduced in 1786. The culture of all these plants, and of the other species, of which there are many (but not showy enough to require particular notice), is the same as that of Diosma: they require steady but moderate watering, and a free circulation of air.

Lechenaultia, a beautiful genus of *Goodenoviæ*, lately introduced (1824). It is, in its inflorescence, not far removed from *Lobelia*, with the habit and foliage of a *heath*: like that, it is struck in white sand, though with more facility, and grows in sandy black peat.—*Lechenaultia formosa* and *oblata*, New Holland plants. One was figured in *Bot. Reg.* 916, the taller in *Sweet's Australasia*. The leaves are small, heath-like; branches slender, wavy, and graceful; flowers solitary, from the axils of the leaves, scattered here and there on the young wood; they are of a singular, irregular shape, somewhat like a flat opera-hat cut into divisions, of a beautiful reddish-orange tint. I have had one in bloom, with very short intermissions, from March to the middle of August, and have seen the flower, in good greenhouses, as early as January. They blow when scarcely three inches high, and seldom rise higher than one foot: nothing can be more desirable, where the prevailing taste is directed to minute and beautiful germs.

PITTOSPORUM, a genus so named from the resinous or pitchy fluid that attaches to the seed-vessel; the plant, in fact, when bruised, has an aromatic resinous odour. It furnishes fine evergreens, with glossy foliage, very conspicuous, though rather sombre. Natural order *Pittosporeæ.*—*Pittosporum tobira,* glossy-leaved; with clusters of small milk-white odoriferous flowers at the terminations of the branches in the spring. The plant is a native of China: 1804 is the date of its arrival here. *Bot. Mag.* 1396.

——*Pittosporum undulatum,* wave-leaved; peduncles of the flowers longer than in the foregoing; flowers terminal, but more open; loose and detached; white. *Bot. Reg.* 16. The plants are elegant evergreens, and tolerably hardy; they grow three or four feet high in pots; but the former, in a conservatory, will reach to twelve and fifteen feet. Both may be raised by cuttings, but with some difficulty. The best method, I think, is to place three or four in sanded holes, in a pot of very light sandy loam well drained. Choose the semi-ripe, woody laterals of the last growth; place each cutting so that one side rests against the side of the pot; plunge the pot in a hole of the ground, the bottom of which has on it an inch or two of coal ashes. The spot ought to be cool, guarded by a north wall, or the shade of an evergreen, from the sun; and a hand-glass should cover the pot. It may remain thus—being watered occasionally—till frost come in, when it should be taken up, and still kept cool, till the season when the mother plants exhibit signs of growth. Then a slight degree of heat, in a gentle hot-bed, will excite the plant to protrude roots and leaves. I have dwelt upon this mode of increasing woody evergreens, because it will apply to *Camellias* and other valuable shrubs. The directions are founded upon the fact, that many plants protrude a callus under the bark of a cutting during autumn, if they be kept cool and moist, which requires only a stimulus to bring it to a perfect development of roots in early spring. Sandy loam or light loam, two parts, and sandy peat one part, form a proper medium for the plants.—Many other plants might be selected from the first order, but none that possess any degree of beauty. Still fewer present themselves in the second or third orders, as they are either hardy species or such as ought to be cultivated in the stove. The fourth contains but one *hardy* genus, the elegant *Parnassia*, or grass of Parnassus. In the fifth, *Pentagynia*, (the subjects of which have usually five styles), we first meet with a tribe of plants with succulent leaves, above fifty of which are arranged under three genera, which formerly constituted only one, *i. e.* CRASSULA. I select four of these plants for their beauty.

**ROCHEA**, formerly *Crassula falcata*; sickle-leaved Rochea; with thick, broad, irregular, glaucous-green leaves, (that is, a green with a grey tint like that of sea-kail), one edge is sharp, the other thick and blunt; flowers red, in terminal cymes or clusters; small, but numerous. Cape of Good Hope, anno 1795. *Bot. Mag.* 2035.

**KALOSANTHES** *coccinea*, formerly *Crassula*; leaves in pairs, clothing the stem, to which they are close seated; flowers *red*, from among the terminal bracteal leaves; a very showy plant; not so tall as the last named, but growing to 1 foot or 18 inches high: it is defective, in as far as the lower leaves of old plants wither and become brown and ugly appendages. Also from the Cape, anno 1710. *Bot. Mag.* 495.——*Kalosanthes versicolor*; changeable Kalosanthes; of the habit of the former, but less in its leaves and flowers; the latter change from red to almost white, tinted with red. Cape, anno 1817. *Bot. Reg.* 320.——*Kalosanthes bicolor*, two-coloured Kalosanthes, red and yellow; two feet high. From the Cape, 1800. All these, and indeed every subject of *Crassulaceæ*, may be raised with great facility by cuttings, having a small portion of the more woody stem at the bottom; kept to dry on a shelf for several days; then planted in sandy loam, with one-fourth part, or even half, lime or brick rubbish. Little water need be given at any time; scarcely any from October to March. They will grow with much richer foliage in perfectly decayed manure; peat and leaf mould, equal parts, as the *Cacti*, but will not perhaps flower so readily. The four plants just described generally blow from June to September.

LINUM, flax; a genus which contains a great number of hardy and herbaceous subjects, though but few shrubs. One is a native of Candia, and adapted to the greenhouse,—it is *Linum arboreum*, an under shrub, though called *tree flax*; its flowers are light yellow, produced at the ends of the branches, which, in common culture, rarely are seen 18 inches high; peat and loam suit it, though it may be grown in garden earth; it is propagated by cuttings, and blows freely all the summer. *Bot. Mag.* 234.

---

## ON THE DEGENERACY OF THE POTATO.

By Mr WILLIAM PATON, Greenaby, Bred, Isle of Man.

NOTHING need be said on the value of the potato, and, consequently, on the importance of investigating the causes which may either deteriorate its quality, or lessen its productiveness.

For some time past, there has been much complaint relative to its being infected with a disease called the *taint*, and inquiry has very judiciously been courted concerning the cause of it, and the means by which it may be prevented. Some of the correspondents of this Journal have assigned reasons for its existence, which must be admitted to be plausible, and to a certain extent correct; but after making a variety of experiments, and gathering information from different potato growers, I have been led to form conclusions respecting the causes of this disease, which do not yet appear to have received the attention which they seem to myself to merit. While most correspondents have noticed the injurious influence of external causes in producing the taint, they seem not to have directed their attention sufficiently to those which are inherent. I believe it will be found that where this disease has been most prevalent, it has affected most seriously those sorts of potatoes which, from their superior quality, have been cultivated for the greatest length of time, and that it has been most destructive among those sorts which are marked by peculiar delicacy. This clearly shews that there must be some cause of the disease in the potato itself, which may indeed be increased by *external* causes, but which, at the same time, must be regarded as independent of them. With these views, I consider that the means of preventing the taint must be applied both to the removal of whatever of an external nature may be found injurious to its health, and also to the counteraction of its internal causes of disease.

Among the external causes of the evil in question, may certainly be considered an unfavourable state of the atmosphere, though, from my own observation, I am inclined to think that this rarely produces a deficient crop, if all other circumstances are favourable. *External drought*, from being adverse to the vegetation of the sets, may, and no doubt sometimes does, subject them to the taint. There is also reason to think that *external moisture*, when accompanied with colds, by chilling the sets, produces a similar result, but these are causes over which we have no control. From the use of *unfermented manure*, the same effect will, in all probability, sometimes follow, and in cases in which the land has not been *sufficiently pulverised* before being planted, the evil complained of has been found to prevail extensively, and probably through the sets not being sufficiently protected from the influence of the air when the weather has been too dry to be favourable to vegetation. As far, however, as my own observations have extended, those injuries which the potato itself receives, are the most powerful external causes of the disease in question; and among those by far the most powerful, *their being cut when prepared for planting, and their being deprived of their first and strongest shoots*, which too often happens in consequence of their sprouting before they can be removed from the place in which they are preserved during winter; also in undergoing partial fermentation before and after being cut. These must be regarded as serious injuries, which, although they may not so materially affect the coarser and hardier sorts, I have found to be exceedingly destructive to the more delicate, and particularly those which, by reason of their superior quality, have long been cultivated. We now come to what I consider the very root of the evil, namely, *a predisposition in the potato itself to receive the disease in question.* This predisposition I conceive to result from its having degenerated in consequence of having been subjected to a long course of artificial cultivation; and, therefore, that our attention must be directed mainly to the means of preventing this degeneracy, while we endeavour to remove all such external causes of the disease as may be under our control. That the potato, in common with all other cultivated productions of the vegetable world, has a tendency to degenerate when the laws of nature are deviated from, must be granted; and, considering that it is not a native of this country, it is reasonable to expect that it will degenerate in proportion as means are neglected to prevent it from doing so.

This tendency to degenerate is well known to exist even in trees which are cultivated by grafting; and to such an extent, that many of the first sorts of apple-trees which were formerly cultivated with the greatest care, have long since become entirely worthless.

With respect to the potato, nature clearly seems to have made provision for the permanent health, as well as for the productiveness, of her own offspring, in the seed contained in the berry which the plant produces from its stalks; and, consequently, by our endeavouring to perpetuate any particular sort of potato by continually cutting and planting its tubers, it is reasonably to be expected that we shall injure its general properties and powers, and thus gradually render it less fit for food, and more liable to disease. As I have already observed, extensive observation has fully satisfied me that the taint by far more frequently attacks the long cultivated, and more delicate sorts of potatoes, than any others; the former, I conceive, because their vegetative powers have become enfeebled and disordered by a long course of treatment opposed to nature; and the latter, because the very delicacy of their constitution renders them more liable than the hardier sorts to disease.

If the foregoing observations should be deemed correct, it will follow that, in order to be as certain of obtaining as good a crop of potatoes as it is possible to be, *the ground, before being planted, should be thoroughly pulverized; the manure should be well fermented; the sets should be whole potatoes,** *and never deprived of their first shoots, nor allowed to ferment; and, lastly, that a constant succession of new sorts should be raised*

---

* I would recommend for sets, under all circumstances, whole potatoes, somewhat under the middling size, or about as large as a walnut, which may either be separated by riddles, or selected by the hand at the time of digging.

*from the berries of the old ones.* The newly raised sorts would doubtless admit of being cut with safety for several years, and would be but little affected by other external injuries, unless peculiarly delicate, as they would possess all the health and vigour of a plant propagated according to nature's laws. By attending to these few suggestions, the experience of several years of extensive observations warrants me in saying, that a full crop of potatoes may, under all ordinary circumstances of the weather, at all times be secured. I would, however, particularly recommend the raising of a succession of new sorts from the seed contained in the berry of the most approved old ones, as I firmly believe that the disease complained of is mainly to be attributed to this having been too generally neglected. In the year 1833, I raised from the berry a great variety of new sorts. In 1834, the best of them were selected, and planted separately. At the present time, although planted late and cut, they are displaying an extraordinary degree of health and vigour; while, in the same field, and almost by the side of them, some of the old sorts are not only feeble, but both tainted and curled; thus unanswerably proving the necessity of having recourse to the assistance of nature to counteract the evils arising from a long course of artificial, and in some respects injudicious, cultivation. On another occasion I will, in all probability, send the readers of this Journal an account of the future stages of this experiment.

---

## ON THE EXCRETION FROM THE ROOTS OF PLANTS.

By Mr TOWERS.

It may appear superfluous to recur to the subject of secretion and exudation from the roots of plants; but as numbers seem to doubt, and observation and experiment are regarded as little better than theoretic halucinations, I feel it right to enter the lists once more. M. De Candolle founded his hypothesis upon philosophical deduction; M. Macaire experimented and tested chemically; I reasoned from observation, and still believe I was the first who, in our own country, placed the theory before the public grounded upon the evidence of comparative observations. I, in

1829, knew nothing of the hypothesis of Geneva, and had met with no observations upon the phenomena; but I listened to the remarks of practical men, of gardeners, cottagers, and intelligent domestic cultivators. I observed for myself, and, without looking into the laboratory, or applying any non-natural test or reagent, arrived at and stated those opinions which I published in the "Gardener's Manual." So much I may be permitted to say, in answer to those objections which have been made in reference to the operations of the laboratory. Prospectively, I shall observe once for all, that, much as I prize experimental chemistry, I witness and read of so many factitious results, when subjects *endued with a vital principle* are acted upon by chemical powers, that I have desisted, and mean to desist, from any attempts to derive irrefragable evidence from chemical tests, and now base my opinions solely upon the facts resulting from observations of vegetable phenomena.

That excretions really are made there appears to be no rational ground to doubt: no one, I think, can go through a course of gardening operations, without becoming assured that the soil in the field, the garden, and in pots, containing plants, becomes replete, sometimes to saturation, with specific products. I may mention one fact which has just occurred. I observed that the roots of a young plant of *Tropæolum atropurpureum*, Lord Auckland's dark-coloured nasturtium, had protruded from the hole in the bottom of the pot. The size of this pot is what we here style a 48; it measures about four inches internal diameter. On striking out the ball, I was astonished to perceive the extremely powerful odour which was emitted. The roots had completely worked themselves around the pot, the fibres were matted, but the whole mass was pungent, as if a quantity of water-cresses had been bruised and applied to the nose. In potting, a great variety indeed of peculiar odours are discernible. *Heliotropes* yield a powerful and almost animal scent; all the *Justicias* a stale and fœtid vegetable effluvia; coffee one of rather a leguminous character; but that of the *Tropæolum* was peculiarly pungent. I could enumerate a great many potted plants which yield very distinct odours from the ball of roots, that are quite undiscernible till the plants are removed from the pots; but I desist, as the experiments may be tried by every one

I wish, in this place, to meet an objection which may be started against the evidence of odours adduced above; it is this:—We admit, many may say, that soils about the roots of plants, whether they be confined to pots, or free in the open plots of the garden, emit peculiar odours; but do not these arise *from the roots themselves*, and not from matters exuded by them, and dispersed among the particles of the soil? I am prepared to grant that the roots, as well as the flowers of a vegetable, may possess specific aromas, but these cannot be diffused unless they be first emitted; the fact of diffusion, and that to an extent which renders them perceptible at the distance of many inches, or even feet, is demonstrative of the hypothesis of exudation—that which is disseminated must be first given forth: this admits of neither hesitation nor doubt.

If, then, the ground be embued with odorous matter transmitted by the porous system of the roots; or if it be admitted, that the odours arise from the very substance itself of millions of fibres, broken off, and retained by the soil, which cannot by any art be separated from it, the argument is still one and the same; for it is a matter of pure indifference (provided the ground become saturated with any specific substance) whether that substance be gaseous or solid, whether it have been transmitted from the plant, or produced by admixture with broken and lacerated portions of the vegetable body itself. Not to weary the reader with arguments upon a subject which must be self-evident, I shall close my present remarks by observing, that I build my hypothesis much more upon the phenomena of vegetable life and growth, that is, upon natural facts, than upon the results of chemical experiments; and I shall shortly adduce a very closely pursued experiment of a compound nature, in order to establish the fact, that *chemical agency ought* not to be *employed* with *substances endowed with the vital principle*, and that the inferences deduced from experiments upon living vegetables placed in unnatural situations are frequently founded in, and lead to error. Dead matter, mineral substances, and the like, are the proper subjects for chemical analysis; upon them its power can be legitimately brought to bear. The living being is embued with powers peculiar to itself; it is subjected to laws that govern its mode of existence; all its phenomena are indeed dependent upon a specific vital energy; hence we cannot with safety attempt to arrive at definite conclusions from the operation of agents which interfere with and destroy that energy. M. Macaire's experiments are conclusive as far as they go; his ingenuity, and the zeal with which he followed up its dictates, are highly to be applauded; but the experiments which I above alluded to, will, I doubt not, afford proof, that *nature must be investigated in her own way*, and that he who assails, instead of consulting her, will of necessity become embarrassed by perplexing and contradictory results.

That which led me, in the summer of 1834, to undertake my very protracted experiment, was the assertion frequently met with, that the *sap-vessels of plants had been, and might be again, made manifest by the agency of chemical tests.* I had long doubted the correctness of this assertion, and therefore determined to bring the matter to immediate issue. Conceiving that the *balsam* (*Balsamina hortensis*) presented the readiest means to effect my purpose, because of its rapid growth, juiciness, and great transparency of stem, I selected three cuttings from a plant of nearly the same size; they were about three inches long; being placed in a bottle of water, and in the stove, they all emitted roots in a very few days. When these had grown an inch or two long, I raised each plant without injuring a fibre, and planted them in three small pots containing the simplest loam I could find, I mean, by this term, a loam free from any foreign manuring substance. The plants were potted at the same time, watered with clear water, and set in the stove to revive; in fact, they never drooped, but quickly establishing their roots in the loam, began to grow. Intermediately, two solutions were prepared, one of *sulphate of iron*, brought to the state of *peroxide* by the addition of a few drops of nitrous acid; the strength of this liquor was so considerable, that the tongue could not conveniently support its astringency; one-fourth of a fluid drachm, a saturated liquor of the peroxide, being added to four ounces of rain water. The second solution consisted of a drachm of powdered Brazil-wood, digested in four ounces of boiling rain water, strained when cold, and tinged an intense crimson purple by the addition of a few drops of pure (*i. e. caustic*) potassa liquor.

The three plants were then treated in the following manner —One was marked " water," the second " colour," and the third " iron." To the first, pure rain water only was applied, to the second, the extract of Brazil-wood, and to the third, the solution of iron.

The experiment commenced at the end of July, and was continued till the 17th of August. The plants were always moistened in the way pointed out, with the simple exception, that, once or twice, when a powerful heat had quite dried the soil of the two balsams artificially treated, a little pure water was given to restore its proper texture. The reader is requested to notice particularly the results now to be stated. The first, marked " water," was healthy, and had grown to the height of a foot; had it been in rich soil, and even in a pot of moderate size, it would have been much larger, but the three were retained in the smallest sixties, that is, in vehicles scarcely two inches wide at the top.

No. 2, with solution of Brazil-wood, was not quite so vigorous, but it was nearly as tall and healthy as No. 1. No. 3 was also healthy, but not so tall, and it contracted a slight curve in the stem. The soil of No. 2 became almost as black as ink; that of No. 3 had all the appearance of mere rust.

Now, if the roots of plants while in a natural state, living and growing in soils, really absorb chemical or vegetable fluids, it ought to follow, that the solution of Brazil-wood, having entered the sap vessels, would yield a dye of black on the application of a solution of green sulphate of iron. To ascertain the fact, I placed a minute drop of the Brazil liquid on a piece of white paper, and applied to it a little drop of the solution of iron, and the formation of ink instantly proved the delicacy and correctness of the test. I then cut a slice from the stem of the balsam (No. 2), and, having a microscope at hand, examined it and the stem in every way and direction. I called in a witness, one whose eyes were acute in all botanical investigations; no trace of colouring matter could be discovered, and the iron test produced no effect or discoloration whatsoever. Hence it may be asserted, that the living roots of a balsam with a white stem had not taken up the thousandth part of a fluid drop of the colouring matter of Brazil-wood. No. 3 was then investigated, and the detached portions examined in every way, yet no trace of yellow was perceivable. If water, diluted with even one hundredth part of a solution of peroxide of iron, be tested with prussiate of potassa (*hydrocyanate of potassa*), a blue shade more or less intense will be the inevitable result. This test was rigidly applied, and not a hint of blue, in vessel, cell, or fibre, could be discerned. Hence it was fair to conclude also, that the living balsam, *in mould*, could not take up the slightest quantity of iron. To make assurance still more sure, two other balsams were tested, one—a rooted plant—was taken from the water without injuring its roots, and placed in a solution of peroxide of iron of the strength described; it was killed almost instantly, and fell withered over the side of the glass vessel. The other was an unrooted cutting. I placed it in a decoction of Brazil-wood, and, so far from striking roots therein (as it would have done freely in water), it became sickly, and died in a day or two.

I draw two important inferences from these experiments: the *first* is, that plants naturally situated have, by the agency of their vital principle—be that what it may—a power to select and absorb appropriate food; but that the ground may be so saturated with vicious or unnutritious matters, as to prevent the secretion of a due supply of aliment. *Second*, That the true sap-vessels act only while the plant remains undisturbed, and in its natural bed. Persons accustomed to vegetable dissection, have flattered themselves, and indeed asserted, that the vessels may be detected by placing cuttings in coloured infusions. Some have also said (and this is a tacit admission of a weighty fact), that if *rooted* plants be placed in such infusions, &c. they *will absorb*, *provided the roots be first cut through* near their points. It appears to me certain, that all investigations conducted with mutilated subjects, such as cuttings, slips, wounded roots, and the like, tend to mislead the judgment, and to falsify the inquiry. I do not venture to assert that there are no *exceptions*; but I hesitate not to say that plants in health, living and growing in soil, will not absorb artificial, innutritive substances; they elaborate and secrete; and the soil is to them an appropriate medium, an adjunct of great consequence, through the texture and composition of which they are enabled to carry on the processes which are essential to their being and support. All mutilations are just so many sophistications, and the inferences deduced from the phenomena they afford, tend to error and false philosophy.

That it may not be thought I have introduced a recital which applies to an inquiry into the arrangement and *offices of the sap-vessels*, rather than to one on *radical excretion*, I must add, that the experiments, though directly bearing upon the question of the conducting vessels of plants, leads us to a just appreciation of the value of chemical experiments, when performed upon living beings. We perceive plainly that plants, if growing in soil, have a power to reject substances that become utterly destructive when they are applied to the naked and unprotected roots; hence we ought to be very cautious before we receive, with implicit faith, those hypotheses which may be founded upon phenomena produced by chemical agents upon plants artificially situated. I respect the motives of M. Macaire, and highly value his experimental labours, which at one time appeared to me to be so comprehensive, that I partly determined to undertake a series of a similar nature. However, when I witnessed the results of my own investigations, and reasoned upon the diametrically opposite effects produced by the same agents when applied under varying circumstances, I resolved to rely upon the observation of natural phenomena in my endeavour to substantiate the theory of the excretory powers of plants. If, *when in soil*, they absorb nutritive matter, and reject poisonous substances; and, on the other hand, if, when taken from the soil or from water, with their roots in perfect health and security, they die at once, or dwindle away, *when immersed in those very fluids* which are *innocuous* to them as long as their roots are surrounded by earth; then I think it perfectly fair and rational to conclude, that *no certain unerring deductions can be drawn in respect to the quantity or quality of the radical excretions*, from observations or experiments made upon plants, *the naked roots of which are immersed either in water or in chemical fluids*. Beans, wheat, pease, and other vegetables, have germinated in water, and matters have been emitted by their roots, which afforded certain given results, on the application of chemical tests and re-agents; but I would inquire, can any one venture to suppose that the plants thus grown were in a truly natural situation? were they excited as they would have been in soil? were they similarly acted upon by the great natural agents, *light, air, water?* Surely not! The grand medium of elaboration,—that which connects the fluid of the plant with those in the ground which sustain and nourish it,—was absent; in a word, *earth and soil were wanting;* and as without these, not one vegetable being in a thousand can increase and attain maturity (although many will strike roots in simple water), it is unphilosophical to conclude, that the vital functions of any plant can be perfectly carried on in media which disqualify it from attaining its full growth, and entire development of parts. Let us pursue inquiries; let us add fact to fact, and also adduce analogical reasons from observed phenomena; but, at the same time, let us be exceedingly cautious how we apply or draw conclusions from the application of an agency which is opposed to nature, and subverts the natural functions of a living subject exposed to its influence.

Upon mature reflection, then, I cannot conceive that the vegetable secretions, which are phenomena dependent solely upon the vital principle and natural stimuli, will ever be discovered or made manifest by the agency of chemical tests and experiments. That these secretions, however, are effected by the radical processes of vegetables, can scarcely admit of a rational doubt. As a chemist, I may be thought to lose sight of, and prove false to, my early profession; but I make no appeal to chemistry, otherwise than as it enables me to experiment upon tractable substances, and thus to deduce legitimate inferences. I love it as a science, but must repeat my conviction, that we can derive very inefficient aid from the laboratory, when we wish to scrutinize the energy of life; all therein is wrapt up in mystery, which the mind and art of man can neither approach nor unravel.

If, however, we look at a bed of maiden loam, test it *chemically*, and then plant it with successive vegetable crops, we shall perceive a gradual change in the colour of the soil. *This is one main fact.* The assured experience of the benefit derived from a *change of crop*, affords another; and the advantage of a certain order of rotation yields us *a third.* To these facts we may add, the particular aroma that the earth receives; for, though there may be exceptions and many shades of difference, yet we cannot fail to recollect proofs of the emission of certain odorous matters highly characteristic of the vegetable with which the ground has been cropped. To these natural phenomena we must have recourse; and in so doing, if we collect all the evidences which are in the power of any active mind to observe, we shall, I believe, find strong analogies in proof, not only of the theory in question, but of another grand philosophical fact, namely, that *vegetable beings never exhaust a soil*, that the densest sward of grass adds vigour and power to the earth of the meadow, and that weeds—poor despised weeds—unsightly as they appear, are not only harbingers of plenty, and prove the goodness of the soil they so speedily and unaccountably cover, but add riches to it, and a fund of nutriment for other and more refined crops. Let us turn our eyes to the scarcely half-weeded garden of the cottager, and compare the enormous crops of bulky cabbages, healthy sound potatoes, onions, &c. with the comparatively poor and dwindled produce of a more wealthy neighbour, whose garden is seldom permitted to be disgraced by the presence of an unsightly weed. Let me not, however, be misunderstood. I am an advocate for cleanliness, industry, and order; and I know that native weeds may overpower a crop, and deprive it of solar, electrical, and aërial influences; but do not let us be so unphilosophical as to suppose that these sturdy natives *impoverish.* All we have to do is to watch their progress in the garden and the field, and never to suffer them to become masters. It is the duty of the farmer and the gardener to hail the presence of weeds as an evidence of a fertilizing principle, and then, by watchfulness and industry, to convert them to manure. But I shall not enlarge on this subject now.

# FIAR PRICES OF GRAIN in FORFARSHIRE, from Crop 1779 to Crop 1834, both inclusive.

[The Fiar Prices of Grain form so important a reference of value for the payment of rents and public burdens in this country, that full and accurate tables of them must prove valuable to the land-valuator, statistician, and political economist. With this view, we intend to insert them from every county, as far back as they have been recorded; and hope that, for the promotion of this our object, the Sheriff-clerks, or others who' feel an interest in such matters in the county towns, will favour us with such a copy from each county as the one which we just now present to our readers from Forfarshire. For this document we are obliged to our friend Mr Thomas Carnaby of Forfar.]

| Crops. | Time when struck. | White Wheat. | | | Red Wheat. | | | Barley Bear. | | | Chester Bear. | | | Oatmeal. | | | White Oats. | | | Broaked Oats. | | | Sheach or Black Oats. | | | Pease. | | | Rye. | | | Oats. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | s. | £ | s. | d. | £ | s. | d. |
| 1779, | 23d Feb. 1780,... | 0 | 14 | 0 | 0 | 13 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 6 | 0 | 8 | 0 | 0 | 8 | 0 | 0 | 7 | 0 | 0 | 8 | 6 | | | |
| 1780, | 20th ... 1781,... | 0 | 19 | 0 | 0 | 18 | 0 | 0 | 11 | 6 | 0 | 10 | 0 | 0 | 11 | 6 | 0 | 9 | 6 | 0 | 8 | 0 | 0 | 8 | 0 | 0 | 8 | 9 | 0 | 11 | 0 | | | |
| 1781, | 20th ... 1782,... | 0 | 18 | 6 | 0 | 17 | 6 | 0 | 11 | 0 | 0 | 10 | 0 | 0 | 12 | 0 | 0 | 10 | 9 | 0 | 9 | 6 | 0 | 9 | 6 | 0 | 10 | 6 | 0 | 10 | 0 | | | |
| 1782, | 19th ... 1783,... | 1 | 2 | 0 | 1 | 1 | 6 | 0 | 18 | 0 | 0 | 16 | 6 | 0 | 17 | 4 | 0 | 13 | 0 | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 15 | 0 | 0 | 11 | 6 | | | |
| 1783, | 18th ... 1784,... | 1 | 0 | 0 | 0 | 19 | 0 | 0 | 16 | 0 | 0 | 14 | | 0 | 16 | 0 | 0 | 14 | 6 | 0 | 12 | 6 | 0 | 12 | 6 | 0 | 14 | 6 | 0 | 10 | 3 | | | |
| 1784, | 16th ... 1785,... | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 16 | 0 | 0 | 14 | 3 | 0 | 14 | 0 | 0 | 13 | 0 | | | | | | | 0 | 12 | 6 | 0 | 10 | 6 | | | |
| 1785, | 15th ... 1786,... | 0 | 19 | 6 | 0 | 19 | 0 | 0 | 14 | 6 | 0 | 13 | 0 | 0 | 13 | 0 | 0 | 12 | 0 | | | | | | | 0 | 11 | 0 | 0 | 9 | 9 | | | |
| 1786, | 14th ... 1787,... | 0 | 18 | 0 | 0 | 17 | 6 | 0 | 14 | 9 | 0 | 13 | 4 | 0 | 16 | 0 | 0 | 13 | 0 | | | | | | | 0 | 13 | 4 | 0 | 12 | 0 | | | |
| 1787, | 13th ... 1788,... | 1 | 0 | 0 | 0 | 19 | 0 | 0 | 14 | 6 | 0 | 13 | 4 | 0 | 14 | 6 | | | | | | | | | | 0 | 12 | 0 | 0 | 10 | 0 | 0 | 12 | 6 |
| 1788, | 18th ... 1789,... | 1 | 1 | 6 | 1 | 1 | 6 | 0 | 12 | 0 | 0 | 10 | 6 | 0 | 1 | 6 | | | | | | | | | | 0 | 9 | 6 | 0 | 10 | 0 | 0 | 12 | 0 |
| 1789, | 17th ... 1790,... | 1 | 2 | 6 | 1 | 2 | 6 | 0 | 15 | 0 | 0 | 13 | 4 | 0 | 13 | 4 | | | | | | | | | | | ... | | | ... | | 0 | 12 | 0 |
| 1790, | 16th ... 1791,... | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 14 | 3 | 0 | 12 | 6 | 0 | 13 | 6 | | | | | | | | | | 0 | 12 | 0 | 0 | 10 | 6 | | 13 | 0 |
| 1791, | 15th ... 1792,... | 1 | 1 | 0 | 1 | 0 | 6 | 0 | 17 | 0 | 0 | 1 | 0 | 0 | 15 | 6 | | | | | | | | | | 0 | 14 | 0 | 0 | 12 | 0 | 0 | 14 | 0 |
| 1792, | 16th ... 1793,... | 0 | 19 | 10 | 0 | 19 | 3 | 0 | 18 | 6 | 0 | 16 | 6 | 0 | 16 | 6 | | | | | | | | | | | | | 0 | 12 | 0 | 0 | 12 | |

## FIAR PRICES OF GRAIN in FORFARSHIRE,—*continued.*

| Crops. | Time when struck. | Chester Bear. | | | Oatmeal. | | | Pease. | | | Rye. | | | Oats. | | | Wheat. | | | Barley. | | | Common Oats. | | | Potato Oats. | | | Pease and Beans. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| 1793, | 15th Feb. 1794,... | 0 | 14 | 8 | 0 | 16 | 3 | | | | | | | 0 | 14 | 3 | 1 | 3 | 0 | 0 | 16 | 0 | | | | | | | | | |
| 1794, | 18th ... 1795,... | 0 | 18 | 2 | 0 | 16 | 1 | 0 | 10 | 7½ | | | | 0 | 15 | 11 | 1 | 3 | 2½ | 1 | 0 | 6 | | | | | | | | | |
| 1795, | 17th ... 1796,... | 0 | 19 | 6 | 1 | 0 | 7 | | | | | | | 0 | 15 | 0 | 2 | 4 | 9 | 1 | 0 | 10 | | | | | | | | | |
| 1796, | 18th ... 1797,... | 0 | 19 | 0 | 0 | 17 | 0 | 0 | 13 | 0 | | | | 0 | 16 | 6 | 1 | 5 | 0 | 1 | 1 | 0 | | | | | | | | | |
| 1797, | 17th ... 1798,... | 0 | 11 | 8 | 0 | 14 | 6 | 0 | 11 | 0 | | | | 0 | 13 | 0 | 1 | 0 | 0 | 0 | 13 | 4 | | | | | | | | | |
| 1798, | 16th ... 1799,... | 0 | 14 | 1½ | 0 | 15 | 2¾ | | | | | | | 0 | 14 | 1½ | 1 | 2 | 0¾ | 0 | 15 | 6½ | | | | | | | 0 | 13 | 3 |
| 1799, | 17th ... 1800,... | 1 | 2 | 2 | 1 | 8 | 8 | | | | | | | 1 | 1 | 10 | 1 | 15 | 9 | 1 | 4 | 3 | | | | | | | | | |
| 1800, | 16th ... 1801,... | 2 | 4 | 0 | 2 | 3 | 0 | 1 | 19 | 9 | | | | 1 | 18 | 2 | 2 | 17 | 2 | 2 | 5 | 0 | | | | | | | | | |
| 1801, | 17th ... 1802,... | 1 | 1 | 6 | 0 | 17 | 0 | | | | | | | 0 | 16 | 9 | 1 | 14 | 0 | 1 | 4 | 3 | | | | | | | 0 | 16 | 11 |
| 1802, | 16th ... 1803,... | 0 | 13 | 9 | 0 | 15 | 8 | 0 | 14 | 0 | | | | 0 | 14 | 0 | 1 | 4 | 8 | 0 | 16 | 5 | | | | | | | | | |
| 1803, | 15th ... 1804,... | 0 | 14 | 7 | 0 | 18 | 8 | | | | | | | 0 | 17 | 10 | 1 | 5 | 2 | 0 | 17 | 1 | | | | | | | 0 | 15 | 4 |
| 1804, | 16th ... 1805,... | 1 | 3 | 6 | 0 | 19 | 2 | | | | | | | 0 | 18 | 11 | 1 | 19 | 3 | 1 | 8 | 0 | | | | | | | 0 | 17 | 10 |
| 1805, | 17th ... 1806,... | 0 | 19 | 9½ | 0 | 19 | 6 | 0 | 16 | 0 | | | | 0 | 19 | 11 | 1 | 13 | 3 | 1 | 3 | 3 | | | | | | | 0 | 16 | 0 |
| 1806, | 18th ... 1807,... | 1 | 1 | 5 | 1 | 2 | 0 | | | | | | | 1 | 1 | 0 | 1 | 17 | 6 | 1 | 5 | 6 | | | | | | | 0 | 19 | 0 |
| 1807, | 17th ... 1808,... | 1 | 2 | 6¾ | 1 | 6 | 2 | 1 | 8 | 0 | | | | 1 | 4 | 4½ | 1 | 11 | 6¼ | 1 | 6 | 5½ | | | | | | | 1 | 7 | 9 |
| 1808, | 15th ... 1809,... | 1 | 2 | 4 | 1 | 6 | 11 | | | | 1 | 3 | 0 | | | | 2 | 2 | 11 | 1 | 5 | 8 | 1 | 3 | 11 | 1 | 7 | 0 | 1 | 7 | 7½ |
| 1809, | 17th ... 1810,... | 1 | 2 | 0 | 1 | 5 | 10 | | | | 1 | 3 | 0 | 1 | 3 | 5 | 2 | 1 | 2 | 1 | 7 | 3 | | | | | | | 1 | 3 | 2 |
| 1810, | 16th ... 1811,... | 1 | 2 | 3 | 1 | 1 | 7 | | | | | | | 1 | 0 | 3 | 1 | 15 | 0 | 1 | 4 | 6 | | | | | | | | | |
| 1811, | 15th ... 1812,... | 1 | 5 | 4 | 1 | 3 | 4 | | | | 0 | 19 | 0 | | | | 2 | 6 | 1 | 1 | 11 | 2 | 1 | 0 | 1 | 1 | 3 | 9 | 1 | 3 | 3 |
| 1812, | 15th ... 1813,... | 1 | 12 | 9 | 1 | 13 | 0 | | | | | | | | | | 2 | 16 | 10 | 1 | 17 | 1 | 1 | 9 | 0 | 1 | 13 | 6 | 1 | 15 | 0 |
| 1813, | 16th ... 1814,... | 1 | 9 | 10 | 1 | 2 | 5 | | | | | | | | | | 1 | 13 | 6 | 1 | 11 | 4 | 0 | 19 | 2 | 1 | 1 | 7 | 1 | 0 | 1 |
| 1814, | 18th ... 1815,... | 0 | 17 | 6 | 0 | 17 | 0 | | | | 1 | 0 | 0 | | | | 1 | 7 | 2 | 1 | 1 | 9 | 0 | 14 | 9 | 0 | 17 | 7 | 0 | 15 | 3 |
| 1815, | 15th ... 1816,... | 0 | 12 | 7 | 0 | 14 | 0 | | | | | | | | | | 1 | 3 | 8 | 0 | 16 | 2 | 0 | 12 | 9 | 0 | 14 | 1 | 0 | 11 | 0 |
| 1816, | 15th ... 1817,... | 1 | 7 | 7 | 1 | 7 | 3 | | | | 1 | 7 | 7 | | | | 1 | 17 | 5 | 1 | 14 | 0 | 1 | 0 | 8 | 1 | 6 | 6 | | | |
| 1817, | 18th ... 1818,... | 1 | 8 | 2 | 1 | 6 | 4 | | | | | | | | | | 1 | 18 | 10 | 1 | 9 | 0 | 1 | 4 | 5 | 1 | 6 | 10 | | | |
| 1818, | 17th ... 1819,... | 1 | 12 | 5 | 1 | 4 | 2 | 1 | 4 | 0 | | | | | | | 1 | 18 | 3 | 1 | 18 | 8 | 1 | 3 | 1 | 1 | 4 | 10 | 1 | 4 | 0 |
| 1819, | 16th ... 1820,... | 0 | 17 | 3 | 0 | 15 | 10 | | | | | | | | | | 1 | 10 | 3 | 0 | 19 | 10 | 0 | 16 | 5 | 0 | 17 | 6 | 0 | 16 | 8 |
| 1820, | 17th ... 1821,... | 0 | 18 | 2 | 0 | 15 | 2 | | | | | | | | | | 1 | 9 | 4 | 0 | 17 | 6 | 0 | 15 | 6 | 0 | 16 | 7 | 0 | 14 | 7 |
| 1821, | 16th ... 1822,... | 0 | 15 | 0 | 0 | 15 | 6 | | | | | | | | | | 1 | 8 | 10 | 0 | 18 | 6 | 0 | 14 | 8 | 0 | 16 | 5 | 0 | 11 | 6 |
| 1822, | 26th ... 1823,... | 0 | 17 | 5 | 0 | 14 | 3 | | | | | | | | | | 0 | 19 | 10 | 0 | 19 | 10 | 0 | 13 | 10 | 0 | 14 | 10 | 0 | 11 | 1 |
| 1823, | 18th ... 1824,... | 1 | 3 | 5 | 0 | 19 | 0 | | | | 0 | 15 | 7 | | | | 1 | 7 | 7 | 1 | 5 | 5 | 0 | 19 | 7 | 1 | 0 | 5 | 1 | 3 | 0 |
| 1824, | 26th ... 1825,... | 1 | 6 | 2 | 0 | 18 | 6 | | | | | | | | | | 1 | 12 | 3 | 1 | 9 | 8 | 0 | 17 | 4 | 0 | 19 | 2 | 0 | 17 | 1 |
| 1825, | 25th ... 1826,... | 1 | 4 | 6 | 0 | 18 | 4 | | | | | | | | | | 1 | 8 | 0 | 1 | 7 | 3 | 0 | 19 | 5 | 0 | [illegible] | [illegible] | 0 | [illegible] | [illegible] |

## FIAR PRICES OF GRAIN in FORFARSHIRE,—*continued.*

### Imperial Quarter of 8 Bushels.

| Crops. | Time when struck. | Wheat. | Barley. | Chester Bear. | Potato Oats. | Common Oats. | Pease and Beans. | Oatmeal, per Boll of 140 Imperial lb. | Rye. |
|---|---|---|---|---|---|---|---|---|---|
| 1826, | 24th February 1827,... | £2 18 4 | £1 17 11 | £1 14 4 | £1 18 5 | £1 15 0 | £2 7 7 | £1 7 5 | |
| 1827, | 23d ... 1828,... | 2 11 4 | 1 10 4 | 1 7 9 | 1 3 7 | 1 2 4 | 1 10 3 | 0 16 9 | |
| 1828, | 28th ... 1829,... | 3 14 2 | 1 18 11 | 1 15 5 | 1 7 6 | 1 5 7 | 1 12 11 | 0 18 1 | £1 14 7 |
| 1829, | 27th ... 1830,... | 2 10 3 | 1 8 9 | 1 5 1 | 1 3 1 | 1 1 5 | 1 6 9 | 0 16 3 | |
| 1830, | 26th ... 1831,... | 2 16 5 | 1 10 8 | 1 7 9 | 1 6 6 | 1 4 10 | 1 18 9 | 0 17 10 | 1 18 4 |
| 1831, | 25th ... 1832,... | 3 1 3 | 1 12 9 | 1 7 5 | 1 3 10 | 1 1 8 | 1 9 6 | 0 17 8 | 1 11 1 |
| 1832, | 23d ... 1833,... | 2 13 0 | 1 6 9 | 1 3 5 | 1 0 7 | 0 18 7 | 1 5 3 | 0 14 3 | 1 7 6 |
| 1833, | 22d ... 1834,... | 2 9 3 | 1 4 6 | 1 1 9 | 0 18 3 | 0 16 4 | 1 4 11 | 0 13 1 | 1 9 0 |
| 1834, | 24th ... 135,... | 2 5 0 | 1 7 10 | 1 4 8 | 1 1 10 | 1 0 4 | 1 9 0 | 0 14 9 | 1 6 4 |

### Per the Old Boll of 6 Bushels.

| Crops. | Time when struck. | Wheat. | Barley. | Potato Oats. | Chester Bear. | Common Oats. | Oatmeal. | Pease and Beans. | Rye. | Beans. |
|---|---|---|---|---|---|---|---|---|---|---|
| | 24th February 1827,... | £1 10 0 | £1 8 3 | £1 8 7 | £1 5 8 | £1 6 0 | £1 7 5 | £1 4 1 | | £ s. d. |
| 1826, | 23d ... 1828,... | | No | Record | | | | | | |
| 1827, | 28th ... 1829,... | 1 17 10 | 1 9 0 | 1 0 6 | 1 6 5 | 0 19 1 | 0 18 0 | 0 16 10 | £0 17 8 | |
| 1828, | 27th ... 1830,... | 1 5 8 | 1 1 5 | 0 17 2 | 0 18 8 | 0 16 0 | 0 16 2 | | | |
| 1829, | 26th ... 1831,... | 1 8 9 | 1 2 10 | 0 19 9 | 1 0 8 | 0 18 6 | 0 17 9 | 0 19 10 | | 0 13 8 |
| 1830, | 25th ... 1832,... | 1 11 3 | 1 4 5 | 1 17 10 | 1 0 5 | 0 16 2 | 0 17 7 | 0 15 1 | 0 15 11 | |
| 1831, | 23d ... 1833,... | 1 7 1 | 0 19 11 | 0 15 4 | 0 17 6 | 0 13 10 | 0 14 4 | 0 12 11 | 0 14 1 | |
| 1832, | 22d ... 1834,... | 1 5 2 | 0 18 3 | 0 13 7 | 0 16 3 | 0 12 2 | 0 13 0 | 0 12 9 | 0 14 10 | |
| 1833, | 24th ... 1834,... | 1 3 5 | 1 0 11 | 0 16 6 | 0 18 6 | 0 15 4 | 0 16 9 | 0 15 0 | 0 13 7 | |

## ON THE SPECIES AND VARIETIES OF DOMESTIC FOWLS.

The varieties in the sizes, forms, and colours, of our domestic fowls, are sufficiently striking to attract the notice of the most indifferent observer; while, to those who can find subjects of reflection in every production of nature, they may be made an ample source of interesting remark, as well as of amusing experiment. "If people," says M. Reaumur, "are affected with the kind of pleasure so transitory to the most enthusiastic florists, who procure it but for a few days by a world of care and toil continued through a whole year,—if they are affected by the variety and fine combination of colours in their favourite flowers, the poultry-yard, when well managed, may be made to offer them endless pleasures of the same description."

The greater number of cocks, even those of the commonest breeds, when exposed to the play of the sun's rays, exhibit the brightest colours; and with the glossy brilliancy, beauty, and varied mixture, we are the more struck in proportion to our minute observation of them. The hens, on the other hand, if the breeds have been select, are often no less worthy of admiration. Some, for instance, have spots distributed with great regularity, and so brightly white as to look silvery; others are termed golden, because they are spotted or speckled with a fine golden orange colour; while the more common colours are varied in a manner almost endless—and, upon the whole, domestic fowls offer a multitude of colours, the several shades of which would be found with difficulty, if they were sought for among the birds of the woods or the waters.

It is no less worthy of notice, with regard to colours, that, among the fowls in a poultry-yard, they not unfrequently change in a surprising manner from the time when the chicks cast their down to the annual moult of the full-grown fowls. It is no doubt the regular process, at least after the second and following moults, for the colours to continue much the same. I have at present a hen of the Spanish breed, which has been of a uniform black for two successive moults, but has now her neck, wings, and tail-feathers, tipped with pure white. I have another which was all over of silver-grey colour, but has now her head and neck coal-black, with a ring of fine white at the base of the neck, while the rest of the body is finely speckled with black and snow-white. It is remarkable also, that this change took place in a few weeks, without any obvious moult, so as to cause her to appear anywhere bare of feathers.

M. Reaumur tells us, that in one of his hens which his poultry-woman distinguished from the rest by a crooked claw, when her coat began to be taken notice of, had feathers of the ruddy colour, mixed with brown, so common among dunghil fowls. A year after, this hen was observed to become almost black, with here and there some large white spots. After the second moulting, black was the predominant colour on every part of the body; but, strange to tell, upon the succeeding moult, white was the predominant colour, and only a few black patches about the size of a half-crown piece could be observed. Upon the succeeding moult, all the black spots disappeared, and the hen became uniformly of a pure white like that of a swan. As she was at this time old for a fowl, that is, not less than ten years, it might be thought that old age, which whitens the human hair, likewise whitens the feathers of certain birds; but, in that case, M. Reaumur says the transition from the ruddy to the white ought not to have been made, as it really was, through the black, and was of opinion, as the hen was still vigorous and healthy, that she might again change her colour, if she lived, to brown or black.

A cock which was observed also by M. Reaumur more carefully than the hen just mentioned, afforded him some proofs that the white colour of the feathers was not, at least in that instance, caused by age. The owner of the cock was struck the first time he moulted with the singular change in his colour, and, for five successive moults, there was always a considerable change of colour. In his first year, he had some of the ruddy brown, mixed with white, so common in dunghil cocks; in the second, he was all over ruddy brown, or rather red, without any white; in the third he became uniformly black; in the fourth uniformly white; and in the fifth, when he was presented by the Prior of Bury to M. Reaumur as a curiosity, he had white feathers mixed with a good deal of ruddy colour and brown, bordering upon chestnut, his neck, back, wings and belly being ruddy, and even where there were white feathers, they were mingled with ruddy ones. During the vacation, M. Reaumur was two months without seeing him, but, in this period, he became so changed as not to be recognisable, his feathers having become all over of the finest white. The following year he had partly white feathers, but the greater portion was ruddy, or rather of a fair red. Here, then, was a re-transition from white to a light brown, indicating that the whiteness of his feathers was not owing to the number of his years.

Such is a very small specimen of the interesting observations which might be made in the poultry-yard by those who choose to direct their attention to the changes continually occurring there. In order, however, to lay some foundation for similar inquiries, and what may be deemed of still greater importance by most of the readers of this Journal, the comparative value, in an economical point of view, of different sorts of fowls, I shall here attempt a sketch of the several species and varieties, as described by naturalists and practical writers; and, with these views, it may be advisable to begin with the wild species, natives of the warm climates of the east, supposed to be the origin of the tame varieties. Of the wild there are only two species.

### 1. JAVA COCK.

CHAR. SPEC.—Gallus Bankiva, *Temminck*. *Male:* Comb toothed, compressed; wattled under the mouth; tail somewhat sharpened at the top, and sub-horizontal; feathers of the neck elongated, rounded at the top; head and back fawn-coloured; wing-coverts brown and black; belly and tail black. *Female* brownish-grey and golden yellow; comb and wattles less than in the male. Inhabits Java. Comb and wattles ruddy; feet ash-grey.

*Description.*—This bird is indigenous to the Island of Java, and is specifically distinguished by a red indented comb, red wattles, and cinereous legs and feet. The male has a thin indented or scolloped comb, a sort of beard depending from the under mandible, the tail a little elevated above the level of the rump, and the feathers somewhat imbricated. The feathers of the neck or hackles are long, pendant, and rounded at the tips, and of the finest golden-red; the head and back are fawn-coloured; the wing-coverts are dusky, brownish, and black; and the tail and belly are black.

The female is of a dusky ash-grey and yellowish colour, and has her comb and the beard under the mandible much smaller than the cock, with no feathers on the neck besides the long hackles.

M. Leschenault brought specimens of these birds, male and female, from the Island of Java, and deposited them in the Museum at Paris. According to M. Temminck, they inhabit the forests and the borders of woods, and are exceedingly wild and shy. On examining this species, it will be found to exhibit many points of resemblance with our own barn-door fowls of the middle size, the form and colour being the same, the comb and wattles similar; while the hen so much resembles a common hen, that it is difficult to distinguish it, except by the less erect slant of the tail. The rise of the tail is much more apparent in the cock; but it may be observed, that in all the wild species known, the tail does not rise so high above the level of the rump, nor is it so abundantly provided with covering feathers as in some breeds. It may be that the superabundance of nourishment, and the assiduous care of man, have contributed to the greatest development of all their organs. Various tame breeds, indeed, such as the tufted, the Hamburgh, the double-combed varieties, and others, shew that domestication produces infinite varieties.

The Java cock very much resembles, both in form and colour, the tame Turkish and Bantam varieties of the barn-door fowl; but the tail differs in being nearly horizontal and vaulted in the Java species, while in others it is more raised, and forms two upright planes, meeting above and diverging below. The hackles or feathers which fall from the neck over the top of the back are, as in the tame barn-door varieties, long, with divided plumelets or beards, the feather widening a little, and being rounded. The plumage is decorated with exceedingly brilliant colours. The head, the neck, and all the long feathers of the back, which hang over the rump, are of a shining flame-coloured orange; the top of the back, the small and middle coverts of the wings, are of a fine maroon-purple; the greater wing-coverts are black, tinged with iridescent green; the quill-feathers of the wings are ferruginous red on the outer, and black on the inner edges; the breast, belly, thighs, and tail are black, tinged with iridescent green; the comb, cheeks, throat, and wattles, are of a more or less vivid red; the legs and feet are grey, and furnished with strong spurs; the iris of the eye is yellow.

The female is smaller than the male, and her tail also is a little horizontal and vaulted; she has a small comb and very short wattles; the space round the eyes is naked, as well as the throat; and, on this space, are some small feathers, distant from each other, through which the red skin can be seen; the breast and belly are light-grey or fawn-coloured; on each feather is a small clear ray along the side of the mid-rib or stem; the feathers of the base of the neck are long, with disunited beards or plumelets of a black colour in the middle, and fringed with ochre-yellow; the back, the coverts, the wings, the rump, and the tail, are earthy-grey, marked with numerous black zig-zags; the large feathers of the wings are cinereous-grey.

The reason which M. Temminck gives for believing that the Java cock is the wild stock of our domestic breed, or from which it derives at least its main origin, are, the close resemblance of their females to many of our tame hens; the nature of the feathers, and the forms and distribution of the barbs, which are absolutely the same in many of our tame cocks; and because it is in this species alone that the females are furnished with a comb and small wattles, characters not to be found in any other known wild species.

Another wild species, the jungle cock, has been maintained by Count Buffon and others to be the origin of our domestic breeds; but it will be evident from the following description that this opinion is erroneous.

### 2. JUNGLE COCK.

CHAR. SPEC.—Gallus Sonneratii, *Temm.* *Male:* Comb toothed, compressed; throat wattled beneath; ears naked; tail compressed and ascending; feathers of the neck cartilaginous, spotted, with yellow cartilaginous tips; wing-coverts reddish-chestnut, with the top enlarged, cartilaginous, fulvous; breast somewhat red; body varied with grey, white, and red;—tail-feathers shining violet.—*Female* less in size, and without comb and wattles; head feathered; body variegated with dull brown and red.—Phasianus Gallus, *Lath.* Ind. Ord. ii. 625. *Gmel.* Syst. Nat. i. 737, sp. 1. *Linn.* Faun. Suec. No. 19.—Le Coq Sauvage, *Sonnerat,* Voy. Ind. ii. 153, tab. 94, male; and 160, tab. 95, fem. *Buff.* par *Sonnini,* v. 206, pl. 37, fig. 1 & 2. *Bonat.* Tab. Encl. Orn. 180, pl. 86, fig. 5. Coq et Poule, *Sonnerat,* *Temm.* Pig. et Gallin. ii. 246, Tab. Anat. iii. fig. 1 & 2, a feather of the neck and one of the wing-coverts.—Wild Cock, *Lath.* Synop. iv. 698.—Inhabits India: Length 3 feet 4 inches; comb and wattles red; feet armed with great crooked spurs.

*Description.*—The jungle-cock measures 2 feet 4 inches in length, and inhabits the great forests of India, continues to reproduce there in the wild state, and is clearly distinct from the domestic varieties reared in the same countries by the Hindoos, these resembling, in all respects, the tame breed of fowls in all other quarters of the globe. M. Sonnerat, however, thought very differently, and prided himself much on his supposed discovery of this as the origin of our common fowls, rejecting the statements of Dampier and others as to the existence of wild fowls, probably the Java species, in Timor, and other islands of the Indian seas.

The present species is one-third less in size than our dunghil cock, and, from the level of the feet to the summit of the head, the comb not being included, it measures 14½ inches; the comb is indented; the wattles resemble those of our dunghil-cock, but the naked parts of the throat and head are more considerable. The feathers of the head and neck are longest on the lower parts, and their form and structure are different from those of the same parts in other cocks, whether wild or tame. The midrib or stem of these feathers is gross, and considerably expanded, forming a white stripe along the whole feathers, as far as the tip, where it becomes broader, and gives rise to a sort of gristly plate, of a rounded form, whitish, thin, and very polished. This gristly substance is found still more obvious on the wings. The tip, indeed, of all the wing-feathers forms a broad gristly plate, whose substance is solid, and very thick to the touch, though as shining and polished as in the feathers of the neck. These gristly plates are of a deep red colour, and form by their union a plate of a red maroon, which looks as if it were varnished.

The jungle-hen is smaller than the cock, has neither comb nor wattles, and the throat is covered with feathers, a very marked distinction from our domestic hens. The space around the eyes is naked, and of a reddish colour. All the plumage of the under parts is similar to that of the cock, but by no means so bright. She has not the long feathers at the nape of the neck, nor the thin gristly plates at the tips of the feathers. The whole of the upper parts are more or less blackish-grey, with white rays occupying the middle of the feather, and following the direction of its mid-rib.

The jungle-cock, in a word, seems to be as different from any known variety of our tame fowls, as a hare is from a rabbit, or a goat from a sheep; and the fact, that the jungle-cock is not domesticated in its native country of India, while our dunghil fowls are common there, seems to be decisive against the opinions of M. Sonnerat and Count Buffon.

Of the domestic species there are the following:—

### 3. DOMESTIC COCK.

**CHAR. SPEC.—Gallus Bankiva (A.) domesticus, *Temminck.* *Male:* comb toothed, compressed; throat wattled beneath; tail compressed, ascending: feathers of the neck long and narrow, variegated with fine colours. *Female:* comb and wattles less than in the male.——Gallus domesticus et gallina, *Brisson,* Orn. i. 166; *Idem,* 8vo. p. 45; *Raii,* Synop. 51, A.; *Will.* 109, tab. 26; *Schaef.* El. Orn. tab. 38; *Rom.* Orn. i. 56, tab. 9, and p. 59, tab. 7; Storia degli Uccelli, ii. tab. 207 and 208; *Frisch.* tab. 127–129.—Phasianus gallus domesticus, *Lath.* Ind. Orn. ii. 626, B.; *Linn.* Syst. Nat. i. 270; *Gmel.* Syst. Nat. i. 737, sp. 1, B.; *Retz, Linn.* Faun. Suec. 206; *Borowsk.* Nat. ii. 177, Alector; *Klein,* Aves, 111, A. 1; *Idem,* Ov. 31, tab. 13, fig. 1.—Coq commun à Crete ou Coq villageois, *Buffon,* ii. 116, tab. 2; *Idem,* Pl. Enlum. i.; *Idem* par *Sonnini,* v. 104, tab. 35, fig. 1.; Bonat, Tab. Encycl. Orn. 181, pl. 87, fig. 1; *Gmel.* Trad. Franç. ii. 407, var. b.; *Temm.* Pig. et Gallin. ii. 92, and Tab. Anat. ii. figs. 2, 3, 4, and 5; *Idem,* Tab. Annat. iii. figs. 3 and 4, a feather of the neck and one of the wing-coverts.—Domestic Cock, *Albin.* Birds, iii. tab. 32; *Brown,* Jam. 470; *Sloan,* Jam. ii. 301, Phil. Trans. xii. 923; *Lath.* Gen. Syn. iv. 700.—Das gemeine Kamm oder Haushuhn, *Bechstein,* Natur. Deutschl. iii. 1212, tab. 44. (*a.*) Das Huhn mit dem kleine Kamme; (*b.*) Das Kronenhuhn; (*c.*) Das silberfarbige Huhn; (*d.*) Das schieferblaue Huhn; (*e.*) Das chamoisfarbige Huhn; (*f.*) Das geschupfte oder hermelinartige Huhn; (*g.*) Die Wittwe; (*h.*) Das feuerfarbige und steinfarbige Huhn, *Bechst.*—Gallo commune, Storia degli Uccell', ii. pl. 207, pl. 211 and 213. Horned individuals.**

*Description.*—The domestic cock is characteristically distinguished by a thin indented or scalloped comb, with wattles on each side under the beak; by the tail rising in an arch above the level of the rump; by the feathers of the neck being long and line-like; and by the colours being finely variegated.

The female has the comb and wattles smaller than those of the cock, is smaller in size, and has the colours more dull and sombre.

The influence of domestication in our tame breeds of this species, having produced alterations in the entire forms of the body and of the comb and wattles, it is difficult to indicate the races which owe their origin to the same stock or source; but those races most approaching the primitive species (*G. Bankiva*) have undergone the fewest changes from taming, and have produced by interalliance the breed of dunghil fowls, with comb and wattles,—the breed of tufted fowls, with small comb and wattles, in which those juices proper to form these parts have been, it would appear, expended in the production of the tuft of feathers which ornaments the head;—all those breeds of fowls whose legs and feet are more or less covered with feathers, the origin of which may be attributed to superabundance of nutriment that has in this instance produced feathers on the legs, as it has formed a tuft on the head in the tufted fowl;—the race of Hamburgh cocks which have the head hooded and the feathers stretched back over the ears.

Exclusive of the more marked breeds to be afterwards noticed in detail, Dr Bechstein, as we have seen in the synonymes, has distinguished eight varieties of the common domestic fowl, namely, the fowl with a small comb; the crowned fowl; the silver-coloured fowl; the slate-blue fowl; the chamois-coloured fowl; the ermine-like fowl; the widow, which has white tear-like spots on a darker ground; and the fire and stone coloured fowl. It is, however, difficult in many cases to identify the distinctions made by foreign writers with the fowls bred in this country. I shall class the varieties therefore as distinctly as I am able, and will be glad to be corrected where I may fall into mistake.

### 4. DUNGHIL COCK.

The sort usually called the dunghil breed is a mongrel arising from crosses of all kinds of varieties, and consequently not distinguishable by any peculiar mark, but partaking more or less of the form and qualities of the parent birds. The varieties in most esteem are of middle size, with dark colours, and white, not yellow legs. Light coloured or white bodies are more tender of constitution, and are said by some not to be good layers, though this does not always hold. White chickens are the best to fatten for the table.

### 5. GAME COCK.

The game cock is the variety termed the English cock by Count Buffon and the French writers. It is more slender both in the body, the neck, the bill, and the legs, than the other sorts, and the colours, particularly in the male, are in most cases very bright and showy. Even of the game cock, however, there are many varieties, some of which are more celebrated than others, among amateurs and feeders. Amongst these Sketchly mentions the black-breasted red, which, when true bred, is of a clear vivid dark red, without any shade of black whatever from the back to the extremities; the upper convex side of the wings equally red and black, even those feathers surrounding the posteriors; the whole tail-feathers black as well as the top of the wings; the beak and legs also black. The female is of a dark partridge colour, with bright red hackles above, black beneath, the breast of a clear brick-red, and the beak and feet black.

The flesh of the game breed is white, tender, and delicate, and on this account marketable; but the propensity to fight is so strong among the chickens, that they often injure or kill one another, and hence it is difficult to rear them in numbers. The eggs are but small in size, but, like the flesh, they are much esteemed for their superior delicacy.

### 6. DORKING COCK.

CHAR. SPEC.—Gallus Bankiva (*E*) pentadactylus, *Temminck.*—*Male and female* with five toes on each foot. Gallus pentadactylus, *Brisson*, Orn. i. 169; *Idem*, 8vo, i. 46; *Frisch*, Tab. 127, and 128: *Rom*. Orn. 62—Le Coq et la Poule à cinq doigts, *Buffon*, Ois. ii. 124; *Sonnini*, v. 190; *Gmel.* Trad. Franç. ii. 408; *Bonat.* Tab. Enc. Orn. 182, c.—Dorking Cock, *Latham*, Synop. iv. 703; Das funfzehiger Huhn, *Bechst*, Nat. Deutsch. iii. 1295.—(*a*) Das sechzehige Huhn; (*b*) Die Spornhenne, *Bechst.*; this variety is crossed from others, and differs only in the number of its toes, *Temm.* Pig. et Gallin. iii. 659.

*Description.*—Nobody can doubt that the production of two hind toes instead of one is merely accidental, like that of two humbs on each hand sometimes observed to run in particular amilies of the human race; but double hind claws are certainy not peculiar to the fowls bred about Dorking in Surrey, for ive-toed fowls are mentioned by Aristotle in Greece, by Pliny nd Columella in Rome, and by Aldrovand in Italy, hundreds of years ago, the breed then as now being reputed good layers. Dr Bechstein mentions a variety with six toes, and another in which the female is furnished with spurs. The writer of the article "Poultry" in *Rees's* Cyclopædia, seemingly on the best information, says it is quite a mistake to suppose that the Dorking breed of fowls have uniformly five toes; but they are of a larger size than the ordinary dunghil fowls, the body long and the eggs large. The flesh is rather yellow than white, and requires to be improved by castration. It is not improbable that this large breed is a cross between the Malay or Shackback and the game variety. The colours are as variable as those of the dunghil fowl, but about Dorking white is most prevalent, and many esteem a white colour to be no less essential to the genuine breed than the supernumerary hind claw.

### 7. POLAND COCK.

**CHAR. SPEC.**—Gallus giganteus, *Temminck.* Male and female . . . . . Coq Jago, *Marsd.* Voy. à Sumatra, Trad. Franç.; *Temm.* Pig. et Gallin. ii. 84, et Tab. Anat. 2, fig. 1. The foot of the natural size—Inhabits Java and Sumatra; is twice as large as the common cock; comb and wattles bright red.—(*A.*) Patavinus. Comb toothed, variegated with beautiful colours. Gallus Patavinus, *Brisson*, Orn. i. 170; *Idem*, 8vo, i. 46.: *Aldrovand.* Av. ii. 310 and 311, Tab.; *Rom.* Orn. Tab. 8 and 9, 63. Storia degli Uccelli. ii. pl. 200 and 211.—Le Coq de Caux ou de Padoue, et les Poules de Sansevarre; *Brisson*, Orn. ii. 125; *Gmel.* Trad. Franç. ii. 409; *Tem.* Pig. et Gallin. ii. 86.—Das Paduanische Huhn, *Bechst.* Nat. Deutschs. iii. 1293.—Paduan Cock, *Latham*, Synop. iv. 707. Size agrees with the *Gallo giganteo*, and twice the size of the common cock. *Temm.* ut supra, iii. 654.

*Description.*—The original of this fine breed is supposed by Temminck to be the wild species described by Marsden as a native of Java and Sumatra, and termed by him the Jago cock, though little more is known of the wild sort than that it is double the size of the Java cock (*G. Bankiva*), or of our dunghil variety. Marsden says he has seen in the East a cock of this species, tall enough to pick crumbs from a dining table. They are said to weigh from eight to ten pounds. The comb both of the cock and the hen is large, frequently double, of the form of a crown, with a tufted crest of feathers, often largest in the hen. The voice is stronger and harsher than that of other fowls; but the most singular peculiarity is, that they do not come into full feather till about half grown.

It is now about two hundred years ago, since the Italian naturalist, Aldrovand, says of the Paduan breed, that the cock is very handsome, being adorned with five colours, namely, black, white, green, red, and yellow; that the whole body is black, but the neck is clothed with very white feathers, the wings and back being black tinged with green, the tail of the same colour, with the base of the feathers white; that the head is adorned with a tufted crest of a black colour, but having the base of the feathers white; that the eyes are surrounded with a red spot; that the comb is small, and the beak and feet are yellow.

The hen is all over black, tinged with green, except the small pellicle near the ears, which is white. They produce very large eggs.

### 8. CRESTED COCK.

CHAR. SPEC.—Gallus Bankiva (B.) cristatus, *Temminck*. Crested on the top of the head with thick feathers variegated with fair colours.—Gallus cristatus et Gallina cristata, *Brisson*, Orn. i. 169; *Raii*, Synop. 51. A. i.; *Aldorv.*, Av. ii. 307, var. albo.—Phasianus cristatus, *Lath.*, Ind. Orn. ii. 626, var. y.; *Linn.* Syst. Nat. i. 270, B.; *Gmel.* Syst. Nat. i. 738; *Rets*, Faun. Suec. 206, No. 162; *Borowsk.* Nat. ii. 178, a.; *Rom.* Orn. i. 60.—Le Cog huppé et de Hambourg, *Buffon*, vis. ii. 116; *Idem*, Pl. Enlum. 49; *Sonnini*, v. 179, Tab. 36; *Bonat.* Tab. Enc. Orn. 182; *Gmel.* Trad. Franc. ii. 408. var. a.; *Temm.* Pig. et Gallin. ii. 239.—Crested Cock. *Lath.* Synops. iv. 703.—Das hanben Huhn, *Bechst.* Nat. Deut. iii. 1283. —(*a.*) Das weissee Huhn mit schwartzes Federbusch; (*b.*) Das schwartze Huhn mit weissem Federbusch; (*c.*) Das weisse Huhn mit dem grossem Barte, *Bechst.*; agrees with other kinds except in the feathered crest. *Temm.* ut supra, iii. 656.

*Description.*—This variety is distinguished by a densely tufted crest, while the comb is small, and by being variegated with fine colours, while in all other respects it agrees with the common dunghil breed. Dr Bechstein mentions, as we have seen in the synonymes, the following varieties, namely, white with a black crest; black with a white crest; and the white fowl with a large beard.

The breed of crested fowls is much esteemed by the curious, and is bred with great care. Those who are desirous of propagating any singular varieties separate and confine the individuals, and do not suffer them to mingle with such as have the colours different. Those varieties are more esteemed in proportion as the colours are more rare, or as the tuft of the crest contrasts with the rest of the plumage; but, though the differences of plumage may thus be preserved pretty constant, they seem to owe their origin to the same breed, and cannot be reproduced pure without careful superintendence. These cocks are much esteemed in Egypt, in consequence of the excellence of their flesh, and are so common that they are sold for the value of twopence or three halfpence each. They are equally abundant at the Cape of Good Hope, where their legs also are feathered. Some travellers assert that the Mexican poultry are crested, but these, as well as all the rest on the continent of America, have been introduced from the old world.

There can be little doubt that all the varieties of crested fowls have originated from the inter-crossing of uncrested breeds with the Poland or Paduan.

### 9. HAMBURGH COCK.

Das Hamburgischehuhn, *Bechstein.*

This is a variety of the preceding, distinguished by the thighs and belly being of a velvety-black colour. The deportment of this breed is grave and stately; its iris is yellow; and its eyes are encircled with a ring of brown feathers, from which arises a black tuft that covers the ears. There are other feathers nearly like those behind the comb and beneath the wattles, and broad round black spots on the breast. The legs and feet are of a lead colour, excepting the sole of the foot which is yellowish.

### 10. SPANISH COCK.

This is a large breed, in which the prevailing colour is black with iridescent green, while the combs and wattles even of the females are more than usually large, the top of the comb for the most part flapping over on one side. The caps of the ears are large, and of a bluish-white colour. It is evidently a variety of the Poland, in which the nourishment expended in that to form a crest of feathers goes to enlarge the combs and wattles. The Spanish hens lay very large eggs, and, like the Poland, is esteemed for fine flesh.

### 11. MALAY OR CHITTAGONG COCK.

This is similar in size to the Spanish, differing in the colour, not being so uniformly black, but brown streaked with yellow.

The hens are said to be good layers, and the eggs are large, but their flesh is coarse in the fibre, and of a dark colour. Hybrids between the dunghil breed and the common pheasant are sometimes also termed Malays.

## 12. BANTAM COCK.

CHAR. SPEC.—Gallus Bankiva (G.) pusillus, *Temminck.* Male and female variegated with elegant colours; comb toothed, compressed. In all respects agrees with the Common Bankiva Cock.—Gallus Banticus, *Brisson,* Orn. i. 172, var. b. *Idem,* 8vo. i. 47.—Gallus plumipes, *Rom.* Orn. 61; *Brisson,* Orn. i. 172, var. a.; *Idem,* 8vo, i. 47.—Gallus et Gallina minor, *Frisch,* Tab. 136. and 137.—Phasianus Gallus pusillus et plumipes, *Lath.* Ind. Orn. ii. 627; *Gmel.* 738.—Le Coq de Bantam, *Buffon,* Ois. ii. 119; *Sonnini,* v. 185; *Temm.* Pig. et Gallin.; *Bonat.* Tab. Encycl. Orn. 182; *Gmel.* Trad. Franç. ii. 409; *Frisch,* Vög. Tab. 129.—Les Poules de Camboge et de l'Isthme de Darien, *Buffon,* par *Sonnini,* v. 184. and 185.—Bantam and Rough-footed Cock, *Lath.* Synops. iv. 706 and 707.—*Albin.* Birds, iii. tab. 33 and 34.—*Hayes,* Brit. Birds, tab. 23.—Das Bantamhuhn, *Bechst.* Nat. Deut. iii. 1289, var. e. Some with the feet feathered to the toes, others with the toes feathered, others with the feathers elongated behind.—*Temm.* ut supra, iii. 658.

*Description.*—This is a small variety with short legs, most frequently feathered to the toes, so as sometimes to obstruct the fowls in walking, but booted legs are not exclusively peculiar to bantams; so far from this, that Bantam fanciers, with Sir John Sebright at their head, prefer those which have clean, bright legs, without any vestige of feathers.

The full bred cock should have a rose comb, a well feathered tail, full hackles, a proud lively carriage, and ought not to weigh more than one pound. The nankeen-coloured and the black are the greatest favourites. If of the latter colour, the bird should have no feathers of any other sort in his plumage. The nankeen bird should have his feathers edged with black, his wings barred with purple, his tail-feathers black, his hackles slightly studded with purple, and his breast black, with white edges to the feathers. The hens should be small, clean legged, and match in plumage with the cock.

About two hundred years ago, Aldrovand described the bantam cock to have the neck and back of a chestnut colour, the wings at first black with whitish spots, afterwards black, the quill-feathers being white on the outer and black on the inner sides; the throat, breast, belly, thighs, and legs, black with whitish spots; the feet yellow; the comb double and not very large; the beak yellow; the wattles large; the tail-feathers partly white and partly black.

The female bantam is described by Aldrovand to be of a yellowish colour, and everywhere except the neck marked with oblong black spots; the wattles and comb are small; the beak and feet are yellow.

### 13. TURKISH COCK.

SYNONYM.—Gallus Turcicus, *Brisson*, Orn. i. 170, var. d.; *Idem*, 8vo, i. 46. *Aldrovand*. Av. ii. tab. p. 314–16. *Willugh*. 110.—*Borowsk*. Nat. ii. 180. —Phasianus Turcicus, *Lath*. Ind. Orn. ii. 627. *Gmel*. 738.—Le Coq. de Turquie, *Bonat*. Tab. Encyc. Orn. 182.—Das Turkischehuhn, *Bechst*. Nat. Deut. iii. 1289, var. b.—Turkish Cock, *Lath*. Syn. iv. 707.

*Description*.—This is generally considered to be a variety of the Bantam cock by M. Temminck and other writers, distinguished chiefly by the beauty and variety of its colours.

The Italian naturalist Aldrovand describes the Turkish cock as having the whole body whitish, except the wing-feathers and belly, which are black; the tail black, tinged with iridescent green, and some of the feathers green on the one side, and black on the other; the body is streaked partly with golden and partly with silvery streaks, which add wonderfully to its beauty; the legs and feet are bluish.

The Turkish hen is described by Aldrovand to be white, spotted here and there with black; the feet somewhat blue; the wattles are smaller than those of the cock; she is in every other respect like the cock, except that her neck is yellowish, and her tail all of one colour.

Aldrovand also describes another variety of the Turkish cock, with feet entirely blue; the body spotted with white and black; the neck ashy-yellow; and behind the comb there is a crest of white feathers.

### 14. DWARF COCK.

CHAR. SPEC.—Gallus Bankiva (*D*) Pumilio, *Temm*. Male and female with very short legs; size of a pigeon.—Gallus Pumilio, *Brisson*, Orn. i. 171, sp. 2; *Idem*, 8vo. i. 46; *Raii*, Synops. 61, a, var. 2; *Frisch*, Tab. 133 and 134; *Willughby*, 110, Tab. 26; Storia degli Uccelli, ii. pl. 214.—Phasianus Gallus Pumilio, *Latham*, Ind. Orn. ii. 627, var. n; *Gmel*. Syst. Nat. i. 738, y.—Le Coq nain, *Buffon*, Ois. ii. 118; *Sonnini*, v. 183; *Temm*. Pig. et Gallin. ii. 244.—L'Acaho ou Coq de Madagascar, *Buffon* par *Sonnini*, v. 182; Hist. Gener. des Voy. viii. 603.—Le Coq de Java, *Bonat*. Tab. Enc. Orn. 182.—Dwarf Cock or Creeper, *Lath*. Syn. iv. 706. —Das Zwerghuhn, *Bechstein*, Nat. Deut. ii. 1288; agrees with our own except in size; *Temm*. ut sup. iii. 658.

*Description.*—This variety, which is not larger than a pigeon, differs from the Bantam chiefly in size, and in the shortness of its legs. The acaho of Madagascar is described as very small, with a circle of feathers about the legs, a thick tail, which it carries straight, and the ends of the wings black. Other varieties, said to come from Cambodia, and now found in the Philippine Isles, have the legs so short as to drag the wings on the ground. In addition to these, Buffon mentions a sort of fowls in Britanny, which are always obliged to leap, the legs being so short. These, however, are not small, but of the size of a dunghil fowl. The hens will hatch thirty eggs at a time, that is, more than double the number usually set under common hens. Some think that these dwarf fowls are the Hadrian breed mentioned by Pliny. Aldrovand describes the dwarf hen as all black, except the quill feathers of the wings, which are white at the ends, and on the neck are some white crescent-like spots, and a yellow spot around the eye. The head is furnished with a crest of feathers; the comb is small and dark coloured; the feet are yellowish, and the claws equal and very white. Aldrovand does not mention the cock of this variety.

### 15. RUMKIN.

CHAR. SPEC.—Gallus ecaudatus, primus, *Temm.* Male with the comb entire; lower mandible with double wattles; no tail; rump with large covert feathers; body on both sides brownish-orange. Female not described.—Coq Wallikikili, *Temm.* Pig. et Gallin. ii. 267. Inhabits Ceylon. Feet ash-grey; comb and wattles blood-red. Length 13 or 14 inches. This species is destitute of the rump and coverts.—(*A.*) Gallus ecaudatus, domesticus. Tail or rump awanting, variegated with beautiful colours.—Gallus Persicus, *Brisson*, Orn. i. 174, No. 5; *Jonston*, Av. 58.—Phasianus Gallus ecaudatus, *Latham*, Ind. Orn. ii. 627; *Linn.* Syst. Nat. i. 271, var. y; *Gmel.* Syst. Nat. i. 738; *Raii*, Synops. 51, a. 1, var. 3; *Frisch*, Tab. 131 and 132; *Borowsk*, Nat. ii. 181.—Le Coq sans croupion, *Buffon*, Ois. ii. 122; *Sonnini*, v. 193, No. 16; *Gmel.* Trad. Franç. ii. 408, f; *Temm.* Pig. et Gallin. ii. 271.—Persian Fowl or Rumkin, *Willughby*, Orn. 156, No. 6, Tab. 26.—Rumpless or Persian Cock, *Lath.* Syn. iv. 705.—Das Kluthuhn, *Frisch*, Tab. 131 and 132; *Bechst.* Nat. Deutschl. iii. 1287.—(*a*) Das gehaubte Kluthuhn, *Frisch*, t. 130.

Temminck and other naturalists now consider this to be a distinct species rather than a variety, taking its origin from a wild species still to be found in Ceylon. It is distinguished by the want of a tail, by the comb not being in the wild birds indented, and with the wattles blood-coloured rather than scarlet. The feathers are all of a dusky-orange in the wild birds, but finely variegated in the tame ones. As these fowls were commonly domesticated in Virginia, Buffon erroneously supposed them to be indigenous to America. Although the wild species has not indentations in the comb, this is not the case with the tame ones, which have often a large indented comb. Aldrovand describes the cock as black interspersed with white, the rest white; the feet cinereous. The hen, he says, has a smaller comb than the cock, and is of a rusty colour, except three black feathers in each wing.

From the rumkin being destitute of the gland on the rump, M. Reaumur derived one of his arguments against the almost universal opinion, that this gland is designed to furnish birds with a sort of oil with which to dress their feathers—an opinion not very tenable when closely examined. The rumkin has not the least vestige of this rump gland; but the place where it ought to be, as in other fowls, is more depressed than the rest, the flesh being smooth, and without any secretion or excretory ducts.

"All," says Reaumur, "have been of opinion that the feathers of birds, in order to be sheltered against rain, wanted to be done over with a kind of oil or grease, that might cause the water to run off them without penetrating them, and that this unction wanted to be repeated from time to time. In consequence of this, they have pretended to make us admire a reservoir of unctuous matter placed on the rump of each bird, out of which it expresses, and takes it with its bill to convey and spread it all over the feathers that require it. In order to expose a notion that must needs have been pleasing, since it is universally espoused, it need only be mentioned, that the feathers of the tailless or rumpless hens are as much proof against rain as those of other hens, and of many other birds that are provided with a rump in which the secretion of an unctuous liquor is effected."—(*L'Art faire eclorre*, ii. 10.)

### 16. SILKY COCK.

CHAR. SPEC.—Gallus lanatus, *Temminck*. Male and female white, with feathers like hair. Gallus japonicus, *Brisson*, Orn. i. 175. No. 6. Tab. 17. fig. 2, fem.; *Idem*, 8vo, i. 48.—Phasianus Gallus lanatus, *Latham*, Ind. Orn. ii. 628; *Linn.* Syst. Nat. i. 271; *Gmel.* Syst. Nat. i. 739; *Borowsk.* Nat. ii. 180, g.—Le Coq et La Poule à duvet, *Buffon*, Ois. ii. 121; *Idem*, Pl. Enl. 28. fem. domest.; *Sonnini*, v. 190; *Bonat*, Tab. Ency. Orn. 183, var. g.; *Gmel.* Trad. Franç. ii. 410; *Temm.* Pig. et Gallin. ii. 256.—Silk Cock, *Latham*, Syn. iv. 702.—Das Wollhuhn, *Bechstein*, Nat.

Deut. iii. 1291.—Inhabits China and India. This species differs in having the webs of the feathers disunited, and like hair; feet scaly, naked, or feathered; comb and wattles ruddy blue; skin and periosteum black; iris bright yellow; beak and feet blue.—*Temm.* ut supra, iii. 661.

*Description.*—Modern naturalists make this also a distinct species. It has the whole body covered with feathers, the webs of which are so disunited as to appear like hairs, or glossy silk; the general colour is white, and the legs covered wholly on the outside quite to the toes. As in other varieties, individuals of this sort differ in respect to colour; some are pure white, others dingy-brown, but all of them with dark coloured legs, on which, for the most part, are thick, stout, short spurs; though some are totally without spurs: nor are the legs always feathered. Both this species and the Negro cock described onwards, have the outer skin and the bones black, and have grown into disrepute on account of the facility with which they contaminate our common poultry, so as to render them unseemly both in bones and wattles. They are indigenous in Japan, where they are valued, and also in China, where, however, they are rather scarce. The people in Canton carry them about in cages for sale to the European traders.

### 17. FRIZZLED COCK.

CHAR. SPEC.—Gallus crispus, *Temminck.* Male and female, feathers turned backward, curled up, variegated with fine colours.—Gallus crispus, *Brisson*, Orn. i. 173, pl. 17, fig. 1.; *Idem*, 8vo, i. 47; *Linn.* Syst. Nat. i. 271. n.; *Raii*, Synops. 51. a. 1, var. 4; *Gmel.* Syst. Nat. i. 738; *Frisch*, Tab. 135; *Borowsk*, Nat. ii. 180, Storia degli Uccelli, ii. pl. 215.—Gallina Frieslandica, *Willughby*, Orn. 110.—Le Coq à Plumes frisées, *Buffon*, Ois. ii. 121, Tab. 13; *Sonnini*, v. 189, No. 13; *Gmel.* Trad. Franç. ii. 408; *Bonat*, Tab. Ency. Orn. 182, d.; *Temm.* Pig. et Gallin, ii. 259.—Crisped or Frizzled Cock, *Lath.* Syn. iv. 704; *Bancroft*, Guian. 175, Descript. of Surinam, ii. 159.—Das Strupphuhn, *Frisch*, Vog. Tab. 135; *Bechst.* Nat. Deut. iii. 1290.—Inhabits Asia, Java, Japan; feathers curled up, quill-feathers without rays; some with the feet feathered, others naked.

*Description.*—The present species is commonly named the Friesland cock, from confounding the term "frizzled" with "Friesland." It is a native of Java, Japan, and other parts of eastern Asia. It is distinguished by having all the feathers turned and frizzled, being smaller than our common fowls, more wild, and less suitable for domestic purposes. The chickens are very sensible to cold, and especially to wet, and are seldom reared but for curiosity. Those which partake most of the original breed have white plumage and smooth feet. The flesh is firm and delicate.

### 18. NEGRO COCK.

CHAR. SPEC.—Gallus Morio, *Temminck*. Male and female, comb and wattles black, variegated with gay colours.—Gallus Morio et Mozambicus, *Brisson*, Orn. i. 174; *Idem*, 8vo, i. 48; *Willughby*, Orn. 298.—Phasianus Gallus Morio, *Lath.* Ind. Orn. ii. 628, var. U.; *Linn.* Syst. Nat. i. 271; *Gmel.* Syst. Nat. i. 739, var. U. and V.—Gallus Persicus, epidermide nigricante, S. G. *Gmel.* Voy. iii. 285.—Le Coq Nègre ou de Mozambique, *Buffon*, Ois. ii. 122, Voy. de Siam, i. 279; *Marsd.* Sumatra, i. 188, Trad. Franç.; *Sonnini*, v. 191; *Gmel.* Trad. Franç. ii. 409 and 411, var. m. and n.; *Temm.* Pig. et Gallin. ii. 253.—Blackamore Pullet, *Freyer*, Trav. 53; *Harris*, Coll. Voy. ii. 468.—Negro Cock, *Lath.* Syn. iv. 704.—Inhabits Africa. This bird differs from others, in the comb, wattles, skin, and periosteum being black, so that when boiled for table, it seems as if it had been boiled in ink.—*Temm. ut supra*, iii. 660.

*Description.*—This is a native of Africa, distinguished by the comb, wattles, skin, and bones, being black, as are also the feathers, though the flesh is white and good. Those which have been brought to Europe are only kept from curiosity.

### 19. BARBARY COCK.

This African variety is generally of a pale or dun colour, spotted about the neck sparingly with black; the feathers there being very full; on the crown is a large tuft of feathers, of the same colour with the body.

### 20. DUTCH COCK.

This is usually termed the Pencilled Dutch, and is only a variety of the common dunghil breed, having white feathers spotted with black. These are regularly imported from Holland.

### 21. RUSSIAN COCK.

This breed seems to differ chiefly from others, according to Latham, in having considerable tufts of brown feathers springing from each jaw, and others longer or fuller from the lower mandible, like a Jew's beard.

In the female, there is an upright tuft spreading out from the hind head, of the same silky texture. Independent of these, the cock has the usual comb and wattles, and the hen a small comb likewise. This sort is said to have come from Moscow, and varies in colour, one variety being white, with the ends of the feathers glossy blue or black, giving it a spotted appearance; and the legs being covered with fibrous or downy feathers. Another has the plumage of the game-cock, or fine tawny-orange, spotted with black.

A sort from Russia is mentioned in the Transactions of the Highland Society, vol. x. p. 144, as much esteemed in Scotland for prolific laying; but as no description of these is given, I cannot ascertain their identity with Latham's.

*Ever-laying Fowl.*—Any of the above breeds may become what is termed ever-laying, that is, not inclined to hatch, an artificial temperament produced by domestication.

*Comparison of Sorts.*—The things most necessary to attend to in selecting sorts for breeding, are the number, size, and flavour of the eggs, and the colour and delicacy of the flesh.

*Number of Eggs.*—The Scotch Russian cross with the common breed, seems to stand highest, and next to those the Dorking, Poland, and Spanish.

*Size of Eggs.*—The largest eggs are laid by the Poland and Spanish, the next by the Dorking. The game sorts, and all the small varieties, lay small eggs.

*Flavour of Eggs.*—The finest flavoured eggs are those with bright orange yolks, such as are laid by the game breed, and by speckled varieties of the common breed. The large eggs of the Poland and Spanish have often pale yolks, and little flavour.

*Colour of the Flesh.*—Those with dark coloured or yellow legs, have the flesh of a less pleasing white than those with pale flesh coloured or white legs.

*Delicacy of the Flesh.*—The game breed, the Spanish, and the Dorking, are the most delicate; the Malay coarse and inferior.

---

## ON THE AGRICULTURE AND GENERAL CONDITION OF THE COUNTY OF LIMERICK.

The almost exhaustless fertility of the soil of the county of Limerick forms a melancholy contrast with the poverty and moral degradation of the great mass of its labouring classes, and naturally leads the mind of the political or philanthropical inquirer to examine the various causes which have combined to place above a quarter of a million of human beings, occupying the richest land in Ireland, in a state of mental and physical depression, altogether unknown to persons of the same grade in Great Britain, and comparatively unfamiliar to the peasantry of other portions of Ireland, where Providence has been less bountiful in capability of soil, and in the facility of rendering its management exuberantly productive. The toil-worn occupiers of those poorer regions, where they must either "do or die," would seem to have their labours requited by a special blessing in the good and quiet habits which prevail among them. By an equitable distribution of his gifts, the Almighty fairly balances to their respective inhabitants the labourer's disadvantages of location near "the mountain's rugged breast;" and the luxurious ease of residence in rich soils and under genial suns. Where nature is prodigal, man has comparatively but little to do; his idleness and indolence bring their natural bad results; but where his subsistence depends on assiduous occupation, he has no time for dangerous relaxation; both mind and body being constantly exercised in the pursuits of industry, he has neither the desire nor the temptation to indulge in slothful habits, nor to engage in those mischievous and criminal confederacies which idleness is apt to engender.

With the exception of the adjoining county of Tipperary, that of Limerick is inhabited by the most ignorant and ferocious peasantry in Ireland; and, while the earth produces the finest crops imaginable, its cultivators are among the most degraded and miserable of mankind. The causes of this we shall probably incidentally notice before the conclusion of our sketch. The county of Limerick contains ten baronies, and extends fifty-six British miles from east to west, and about half this distance from north to south, containing 375,320 Irish acres.[*] It is generally a flat district, with but little undulating surface, and is bounded by the chain of Galtee Mountains, which rank among the highest in Ireland. A considerable range of brown or sandstone runs east and west through the county, to the south of which is a great bog-tract, with limestone gravel at intervals, available to improvement, and yet little, if at all, applied. Some trifling improvement in reclaiming land and in planting is, however, taking place at Glenwilliam and Ballynow, by Mr Massey and Mr Cox; but it is a matter of deep regret that there are only two or three resident proprietors in this line from the Shannon to the Blackwater, a distance of forty British miles!

---

[*] One of the good effects of the Ordnance Survey, when completed, will be to bring fairly under assessment half the acres of this county now inequitably and unaccountably free from taxation.

The most fertile portion is comprised in the baronies of Clanwilliam, Coonagh, Coshlea, and Coshma, containing nearly a third of the county, and known by the name of the golden vein, consisting of a rich loam, which can bear repeated courses of the most scourging crops, without deterioration; equally fit for tillage and grazing; and, when under grass, capable of fattening a heavy bullock to the acre, and supporting some sheep besides in winter and spring. This vein extends to a distance of thirty English miles, and reaches in one direction within a short distance of Limerick. There is no part of the county within which lime cannot be obtained at the distance of a dozen miles, though two of the baronies, Coonagh and Ownibeg, have little or no limestone within their own limits.

In the Newcastle district, which is bounded on the west by a chain of limestone hills, *culm* is raised on the property of Mr Goold at Dromadah, and on the estate of the Earl of Devon, which has been for some time past under the management of Mr Furlong, an agent of great ability and zeal, who, possessing the confidence of the present respected proprietor, appears by his judicious conduct to have effected a great improvement on the large estates over which he presides. This property is one of those belonging to absentee proprietors, bearing evidence of care and liberal management. The proprietor has established schools at Newcastle, in which 250 children attend, and, what has materially contributed to the comforts and amelioration in condition of the labouring classes in that really neat and improving town, his Lordship has authorized Mr Furlong to give that class, consisting there of 200 families, houses in the suburbs, with a portion of land attached to each, at the rate of L. 3 per acre (the house included), which is very cheap for valuable town parks, and does not exceed the rent paid by the *farmers* in the neighbourhood. The male occupiers of these allotments have ample occupation in various works on the estate, and are enabled to deposite in the agent's office, in a Savings' Bank, every week, part of their wages, for which they receive tickets exchangable for money at pleasure. It is to be lamented, however, that an improved system of garden culture does not appear to have been introduced in the allotments which these labourers inefficiently cultivate. Potatoes and oats alternately, with a few cabbages, are the crops raised by these cottagers. A gratifying exception, however, to this ordinary system of imperfect management is exhibited by Mr Edward Dartnell, a clerk in the agent's office. This useful and respectable person has a field of six acres, which in June last was cropped as follows:—

| | A. | R. | P. |
|---|---|---|---|
| Early potatoes, . . . . . . | 0 | 2 | 20 |
| Late ditto, . . . . . . . | 1 | 0 | 20 |
| Chevalier barley, . . . . . | 0 | 3 | 0 |
| Common ditto, . . . . . . | 0 | 2 | 20 |
| Oats, . . . . . . . . | 0 | 2 | 20 |
| Clover and grasses cut for soiling, . . | 0 | 1 | 0 |
| Trifolium incarnatum (part of this section of the field sown with turnips after cutting the trifolium), . . . | 0 | 0 | 15 |
| Cattlebeet for two cows and three pigs kept, | 0 | 1 | 10 |
| Turnips, parsnips, cabbage plants, &c. . | 0 | 1 | 10 |
| Nursery of young trees and thorn-quicks, evergreens, &c. . . . . | 0 | 1 | 5 |
| Pasture and meadow, . . . . . | 1 | 3 | 20 |
| | 6 | 3 | 20 |

Such an example of cottage husbandry will, it is presumable, have a good result in Mr Dartnell's vicinity.

The consideration of the labouring families just referred to is so closely associated with the origin and proceedings of the agrarian disturbances in the counties of Limerick, Clare, and Tipperary, that we shall briefly notice them here. They have never, as far as we can learn, been before correctly traced and given to the public. The year 1811 terminated the leases then enjoyed by the late Viscount Courtnay. This property had been held by middlemen—many of them the gentry of the district—at a very low rate, perhaps one-fourth of the real value; and to these middlemen, with very few exceptions happily, no renewals were made. The subtenants were then made immediate tenants of the landlord, at what was considered by a valuator a fair amount of rent. So far all was judicious, and exactly what we hope to see effected on every estate in Ireland whenever the opportunity of extending the clearance system to those destructive interlopers shall present itself. In 1814 it was ascertained by the trustees (of whom we believe the present Earl of Devon was one), that the rents imposed on the said tenants were too high, in consequence of which, abatements were made varying from twenty to forty per cent. besides liberal allowances for liming, draining, &c. limited, however, to a given period, 1818. About the latter year, a new English agent undertook the management of this estate, who, being impressed with the notion that the land would bear an increased rent (the original leases having been unaltered), gave notice to the tenants that he would discontinue the previous rate of abatement in such proportions as he conceived just and applicable to each case, from the representations and reports made to him by those in his confidence. These reports, though probably conscientiously made, were erroneous; or, if not, were most unsatisfactory to the tenants; and, as may be supposed, especially so to those of them who were in arrear, and to the dispossessed middlemen who, having been accustomed to a better style of living (through the profits of the previous middlemen system), were already sufficiently discontented, without the additional annoyance of paying increased rents.

Admitting that Mr Hoskins' mode of proceeding was the most accurately just in principle, it was not in his power to remove from the minds of the persons in question, the impression that he was tyrannical and capricious, and would probably, on a future day, oppress them intolerably by exacting the full rents and arrears. The discontents were fomented by persons of a much higher class, who, being themselves in arrear, perhaps from bad management and extravagant housekeeping, were apprehensive of being called on peremptorily to discharge them. Some of these latter malcontents, in 1820, actually headed the minor fry of tenants in active hostilities, and attacked the agent in the castle, and, when unable to wreak their vengeance upon him, from his gallant defence, barbarously murdered his son, a boy only fifteen years of age, while coursing in the neighbourhood of the house. They also murdered one of two palatines, whom Mr Hoskins had located on the estate; the other escaped. This small band of ruffians, unchecked in its career, and secretly encouraged by many who ought to have endeavoured to overpower them, rapidly swelled by combination to a formidable force, levying money, arms, provisions, and other contributions from the few gentry within the barony of Newcastle, particularly if they knew them to favour Mr Hoskins. The actual operatives in the attack upon Mr Hoskins, and in subsequent outrages, were of the lowest class of the peasantry, backed by and urged on by a few farmers organizing and abetting them privately, and supplying clothes and food to the instruments of their turbulence and crimes. This body afterwards assumed in the north part of the county of Cork a most sanguinary and ferocious character. Thus by raising the rents injudiciously, all those agrarian outrages, which so long kept a great part of Ireland in a state of terror, had their commencement. The former middlemen on the Newcastle estate, had the art of persuading the poor and ignorant small holders that they would be in a worse condition than before, and contrived to ignite the body of combustibles which they themselves had laid together, for their own selfish and fiend-like purposes.

The flame did not burst forth without previous arrangement: the causes first stated had been long in silent operation, and it is well known to some persons that the Executive Government in Ireland, four years previously to Mr Hoskins' agency, had been made aware of the existence of an extensive plot in the south of Ireland, among the land occupiers, to force landlords to lower their rents.

We cannot palliate any infraction of the law, much less excuse the revolting crimes which were committed during the continuance of the predial outrages referred to, but surely the *causes* of such evils should be removed. These causes are to be found in the apathy, the negligence, and the heartlessness of the landowners and larger farmers of the district under consideration. There is no adequate employment for labourers; and, with little or no means of paying for their potato-land, the cottars are extravagantly charged by their hard-hearted, selfish, and screwing employers. Sometimes a sufficient portion of fresh land for the raising of the simple root on which their subsistence depends, was withheld from them even at a high rate. Is it then to be much wondered at, that men so circumstanced have in some instances, by forcibly digging up the rich grass lands (so as to render them unfit for any crop but that to which they look for the means of supporting life), obliged the grass-farmers to share with them the means of supporting life? It is remarkable that none of these alleged confederacies against the rights of landlords, occurred in the adjoining county of Kerry, where the labouring class is the most miserable imaginable. We are led to account for this by the consideration that there is not much difficulty in obtaining a settlement in the mountains of Kerry, and that there is extreme difficulty in obtaining location in Limerick, as in Tipperary also. The population of these latter contiguous counties is very dense, that of the other very thin; and in these a patch of land being of exorbitant value to the poor labourer, he is naturally predisposed to resist every legal power and authority which would deprive him by ejectment of the means of subsistence; hence sprung the Rockite system in these counties. The following short anecdote will shew the determination of these people to hold possession, under every circumstance, of their allotments. A gentleman determined to improve, and build a mansion-house on his property at ——, declared his intentions of taking small portions of land from the labourers around him, giving to each of them constant employment in return, and all reasonable means of support and comfort; but such was their indignation or terror at the prospect of being deprived of their potato land, that they compelled this gentleman to leave the country, and thus voluntarily forfeited all the advantages which they would have derived from his residence. Major Cartwright, a magistrate of police, subsequently became the tenant of Mr ——; but *as an occupier of a place which the people were determined should not be occupied*, his life was attempted. Nothing will induce them to give up land once possessed: their obstinate tenacity in this respect clearly shews that they have no faith in the permanence of employment for hire, nor in their employers,—an appalling consideration to the successors of those whose negligence or ill conduct have origitated the present bad condition of these people. If the attacks of the peasantry upon property had not proceeded farther, if no more serious attacks had been made upon the grazier, who, pursuing his selfish system, fattened bullocks and starved men—though he might have easily combined the fattening of both—we should scarcely grieve at hearing that a fine rich field has been turned up in a moonlight night by the peasantry who were willing to pay full value for it in labour to the owner; but we deeply lament the fundamental *causes* of such infringements on private rights, and would endeavour by available means to remove them.

Mr Furlong has exemplified the wise policy of conciliating the tenantry on Lord Devon's estate, and is likely to effect much local benefit, as his principal is a nobleman of much intelligence, and is, we believe, strongly impressed with a sense of the responsibility which rests upon him as an extensive landowner: and, fortunately for the advantage of this property, an excellent understanding subsisted between the present agent and the English trustees, previously to the proprietorship of the Earl, which has enabled Mr Furlong to bring the estate to its present well ordered condition.

Good roads have been formed through the estate, partly at the owner's expense, and limekilns, with all the implements necessary for quarrying and breaking limestone, have been supplied to the tenantry at Newcastle. The consumption of limestone indeed in many parts of the county has been greatly increased within a few years. On the estate of the Knight of Glyn alone, thirty limekilns may be seen now, where ten were not to be found three years ago. In other places, in the Ballyregan district for instance, the farmers will not build limekilns, although they have pebble limestone on the spot, and rock limestone within a few miles of them. The towns and villages, with an exception or two in the county of Limerick, are wretched in the extreme. Newcastle is pre-eminent in neatness; Adare probably ranks in the second place, though it is superior in point of local scenery, and possesses the advantage of an excellent resident landlord, Lord Dunraven, who possesses a well timbered demesne of exquisite beauty. His Lordship seems anxious to limit the number of houses in the town to the actual wants of the place:

he has built some neat labourers' houses, and will probably raze to the ground the old suburban hovels.

Bruff, one of the Quarter-Session towns, with all its local advantages, is the picture of pauperism and dilapidation, in the richest portion of the county, worse in its condition than even the village of Rathkeale, another of the three Quarter-Session towns of the county. There is one new village at Garbally, on an extent of only twelve acres, built by Mr Lowe, and this is really neat, and creditable to that gentleman's taste.

Mr Waller of Castletown has the reputation of being one of the best resident landlords in the county. Mr Oliver Gascoigne and Sir Aubrey de Vere, and (on a far lower scale of property) Mr Stevelly and Mr Lloyd (the latter a leaseholder), are decided improvers. Mr Lloyd has *created* a gentlemanlike demesne; and Mr Massey of Ballina has been distinguished for taste and zeal; and the Messrs Barrington, near the city, manifest enterprize and judgment in various ways. Alas! a single sentence comprehends all the improvers of this great county.

The leading proprietors, many of them possessing property and residences in other counties, have incomes derived from the soil of Limerick from L.25,000 to L.5000 a-year, yet a great portion of this county (the great barony of Connelloe included), has few or no resident proprietors.

None of the residents set an example of green crop feeding, except on a small scale, as they prefer the naturally luxuriant pasturage for the heavy stock of cows and sheep which the county rears; but surely they could greatly increase the number and weight of their stock by the introduction of turnips, so essential for winter and spring feeding. A patch of clover appears to be the only approximation to the culture of artificial green food. We must except, however, Mr Christie, a countryman of our own, by the way, who holds 800 acres from Lord Dunraven, near Adare, in the barony of Coshma. Mr Christie has turnips and cattlebeet, and manages his farm in a style likely to *astonish the natives.* His crops of wheat, on reclaimed bog, in particular, were this year luxuriant to a degree inconceivable to those who have not seen Limerick or Tipperary wheat crops. This most useful and exemplary farmer, was introduced as his Lordship's farm-manager, by Lord Dunraven, some years ago. He is an experimentalist in the application of bone manure, which we found him in the act of preparing with a large mill worked by two very powerful horses. He also draws large quantities of town dung from Limerick. There seems to be no system of instructing the agricultural classes of Limerick (nor much in any part of Ireland), in their *trade*, which they are allowed to pursue just as they please, taking successive wheat crops without any interruption, and tilling their potatoes very generally in lazy beds. According to the degree of confidence which they may have in their landlords, and the amount of their capital, the facilities of obtaining lime, and the reasonableness of their rents, are the *attempts* of the working farmers at an improved system—attempts we say, because there is nothing of positive excellence in their mode of agriculture. Their system, if so it may be called, has not undergone any change for many years.

The nature of the tenure is to be considered as having a powerful influence in promoting or retarding any real improvement: many farmers hold at will; and, under the present political circumstances, conservative landlords cannot safely give leases, consequently the tenants proceed in the rack-rent and hand-to-mouth style. It is said that a kind and amiable landlord, lately deceased, died without perfecting leases to 130 palatines on his property, as he had intended to do, and that it is very doubtful whether his son will fulfil his father's wishes on this subject. Palatines are unquestionably the most respectable, and improving, and exemplary farmers in the county of Limerick; their houses, whitened and often embellished with climbers, and with gardens and orchards attached, present a very agreeable appearance. To his immortal honour, the Roman Catholic peer Lord Southwell has fostered them on his estate, knowing their worth, when some Protestant proprietors, under one flimsy pretence or other, have neglected their interests, and *allowed* them to emigrate. There has been a conversion of pasture, in some districts, into tillage, and the culture of oats has increased prodigiously within a few years on the more elevated lands, from the recent facilities of obtaining limestone and culm; but the old system of growing corn as long as the land will produce it, without alternating crops of an ameliorating kind, continues still unexploded.

The opening of more roads, under the skilful management of Mr Walker, the present able and indefatigable engineer of the county, would have most important results, and if (*if* is a good sergeant to guard a pass) funds can be raised for the formation of the contemplated railway to Valentia, a distance of 230 miles, the valuable consequences to this fertile country would be incalculable. The plan conceived by Mr Pierce Mahony would open a communication from Dublin, communicating with Naas, Newbridge, Kildare, Portarlington, Monasterevan, Stradbally, Athy, Maryborough, Mountrath, Durrow, Castlecomer, Kilkenny, Templemore, Clonmell, Thurles, Cashill, Mitchelstown, Fermoy, and Mallow. Some scientific men are of opinion, that a line nearer Limerick, by Tipperary, Kilmallock, Charleville, and Buttevant to Mallow, would be a better level; either of these lines would run to Mallow, whence a line could easily be drawn by Millstreet and Killarney to Valentia. But the enormous expense which would attend such a gigantic enterprise, is more than likely to put an extinguisher on the profit; and, after all, the proposition to form the communication between America and Great Britain, through Ireland, by a direct and much shorter cut to Galway or Roundstone Bay, is more feasible and more likely to be adopted. But Nature has already furnished a noble channel through which commercial intercourse can be rendered effective in Limerick. The Shannon bounds it on the west, and the navigation of this noble river, which flows from Limerick uninterruptedly to the sea, a distance of seventy-five miles, is well deserving legislative care. This noble stream is thus admirably described by C. W. Williams, Esq. in his tract on Inland Navigation.

"The river Shannon, unequalled in the British empire, embraces [illegible] miles of continuous navigation (while its tributaries afford that of above [illegible] miles in addition), and from the circumstance of its running through the centre of the kingdom, may be compared, for the purposes of intercourse, to double that length of coast. The advantages of water conveyance are thus presented to an extent of country equal to the whole line of coast between Belfast and Cork, or to more than the entire eastern coast of England. The Shannon washes the shores of ten counties out of thirty-two, viz. Leitrim, Roscommon, Longford, Westmeath, King's County, Galway, Tipperary, Clare, Limerick, and Kerry, and is in connection with two others, Mayo and

Sligo. All of these are abundant in population, and susceptible of great agricultural improvement; and although many of them are periodically exposed to the greatest distress and even famine, yet are without the power of mutual relief or co-operation. Taking, then, the double length of coast which the ten counties present to the navigation at 500 miles, and which, considering the extent of the bays, inlets and rivers, is under the fact, it leaves an average (on the main stream of the river) of fifty miles of coast to each county. This fact alone is sufficiently indicative of what may be done through the instrumentality of this one river.

"Nature appears to have done its part. The capabilities of the river almost provoke the population to industry and intercourse. All the elements of internal and profitable traffic are in abundance. It cannot, therefore, be necessary to urge more strongly than by the bare enumeration of these facts, the value of an intercourse which, from some cause or other, Ireland has never yet possessed. How, then, can we convey to English eyes the picture of the Shannon through its great course? Let us suppose a navigable river taking its rise in some distant county in England, as, for example, from Liverpool, or Essex, or Middlesex. Suppose it occasionally spreading itself into noble and picturesque sheets of water, of twenty miles in length, with numerous islands, receiving the waters of many rivers, and stretching its bays into the adjacent counties, as it were to increase the measure of its utility and beauty. Imagine it winding its way through Hertfordshire and Bedfordshire, Northamptonshire and Warwickshire, and the rich soil of Leicestershire, and after passing by Staffordshire, Derbyshire, and Cheshire, and running a course of 240 miles, falling into the estuary of the Mersey in Lancashire. See it presenting to each of these counties the benefit of fifty miles of navigation, and we shall have a correct idea of the extent and capabilities of this river.

"But how shall we describe the state in which it has remained for ages, as to trading intercourse, and in which three-fourths of it remain to this very hour, absolutely wanting in all the incidents of navigation. For nearly a hundred miles of its length, not a sail or boat to be met with on its waters. No appearance of utility, no indications of industry or capital; even its beauties unknown—deficient to an extent scarcely credible in roads and approaches to it, and consequently having but little connection with the interior to which nature designed its influence should extend; without any employment of its waters. It flows unheeded by, and unproductive of any good. Over many of its districts, of great extent, from the absence of that control which human skill and means could have effected, its waters become a source of wide-spreading waste.

"The inevitable result of this neglect and inactivity is, that, instead of becoming the direct means of connection and intercourse between this family of counties situated on its banks, and of the consolidation of the interests of their respective population; it has, on the contrary, grown up, and remains to the present, a positive and mischievous line of separation; the enemy rather than the ally of social life. Instead of proving the parent of family and trading alliances, it has engendered nothing but a repulsive spirit, productive of enmity, district broils, and almost civil war.

"So effectually has this alienation been accomplished through the succession of ages, and this fourth part of Ireland been detached by the Shannon, that it became not merely distinct as a province, but as a little kingdom in itself: proverbially the country of a people *sui generis*, wild, lawless, and turbulent.

"The kingdom of Connaught, to this hour, is a sort of title to which its inhabitants lay claim, on the very plea of that separation, for which the Shannon, in their eyes, appeared to have been destined. A little consideration on the part of the rulers of the land, should have taught them to regard it as designed by a bountiful Providence to be rather a bond of union, the high road of the neighbouring counties, and a source of mutual dependence, strength, protection, and prosperity. Do we not see in all this the primary cause of that absence of employment at home which drives such hordes to England in search of labour?—this very 'kingdom' sending out the entire of that peasantry which migrate annually to England after a fatiguing journey of a hundred miles by Dublin; and to the midland districts of Ireland, where they go to assist in gathering in the potato harvest to the number of many thousands?

"Need we go further in explaining the cause of the want of approaches to the river, of bridges to connect the neighbouring counties; of improved intercourse on its waters, or the incidents of trade upon its banks? Roads, and even mail-coach roads, in many situations, run within a few miles of it, yet the river itself remains inaccessible from them.

"Mr Nimmo, in his evidence before the Lords' Committee in 1824, observes, 'The Shannon has been made navigable to Lough Allan; but it is remarkable, that upon the western coast of the broad parts of the Shannon, we have not a single landing-place. This complaint was made to me last season, and, upon examination, I found it was a most desirable thing to make provision for landing-places on both sides of the river. We have no quays or roads to the water at any part of the Shannon, except at the bridges; I should suppose that L.4000 or L.5000 will accomplish all that is wanted in making roads and landing-places.'

"Is it possible to read this statement, and be surprised at the population being in want of employment, and disturbed? Under such circumstances, how can the labour of these districts leave any return to the farmer? How can he be induced to employ the now idle hands upon his lands? There is, in fact, no inducement to turn the available surplus labour to account, and it is now dissipated in the destruction of property, 'the turning up' the lands of peaceable proprietors without ostensible motive, and merely because the want of employment creates dissatisfaction, and turns every circumstance into a grievance. This, too, where, if the farmer had sufficient inducement to expend more labour upon his land, not an idle hand would be found in the country, which is invariably but half-laboured and half-productive. To remedy this evil, we must go back to the first cause; the want of means to bring labour, and the fruit of labour, to market, and thus enable it to find its value.

"On the entire 500 miles of coast of the Shannon, there was not, twelve months back, a single crane, an article which, in England, is as common as a waggon or an anchor. It is a melancholy fact, that the towns and districts of Ireland, with the names of which the public ear has lately been familiarised, as the scenes of outrage or distress, are almost without exception, those which are directly connected with the subject before us; and that these names mark at once the line of disturbance and the line of the Shannon. Let, then, this river, be regarded in its great features, bisecting the island, and running with unprofitable splendour in its course of 240 miles, through the heart of the country, with a dense population, within reach of its ameliorating influence;—a population young in civilization and social habits, ignorant, uneducated, unemployed, and dissatisfied. Let it then be asked, is it consistent with common sense to doubt the effect of interchange and intercourse on such a population? Is it reasonable to suppose, that such a river, were its resources developed, could fail of giving value to the labour of the population, and of turning the weakness, the divisions, and the wants of that population into strength, unity, and prosperity?"

It is sincerely to be hoped that the navigation of the Shannon will become an object of national interest; it is mortifying to Irish pride and Irish feelings, that such a channel of industry and wealth has not been more regarded by former governments. "It is indeed surprising" (says Colonel Burgoyne of the Board of Works, in a report to Government), "to find so noble a river through so fine a country, in such a state of neglect. The soil on its banks is of the most fertile nature,—iron, marble, slate, and various other productions of superior quality are also to be found in abundance. Though great capabilities exist for easy intercourse, a perfect stagnation unhappily prevails; and where forests of masts, and the bustling activity of commerce should be witnessed, the scene is desolate, and only varied occasionally by the passage of some struggling boat, which, with difficulty, and perhaps half a cargo, is striving to make its way to one of the Dublin canals. There is perhaps no part of the British dominions, where such an opening is presented for prospective advantages."

This subject is so interesting and important, that we shall beg leave to add the graphic and eloquent description of this river at Castle Connell, a spa-drinking village near the city of Limerick, given by the late Mr Inglis. "It is impossible to ascend by water from Limerick to the village of Castle Connell, owing to the rapids which intervene; but the road, although not close to the river, commands its banks, it carries the traveller through as lovely a country as the imagination can well picture. In variety and woody fertility, it is not surpassed by the most celebrated of the English vales, none of which can boast as an adjunct to its scenery, so noble a river as the Shannon.

On reaching the village of Castle Connell, my first feeling was admiration, my next surprise, that I should never before have heard of Castle Connell. It is surrounded by every kind of beauty, and after spending a day in its neighbourhood, I began to entertain serious doubts, whether even Killarney itself greatly surpassed in beauty the scenery around Castle Connell. Just below the village commence the rapids of the Shannon, of which I never even heard until I reached Limerick, and these are of themselves well worth a visit. I hired a little boat to shoot the upper rapid to take me across, for the scenery is best seen from the Clare side, and I was well repaid for my trouble. A charming walk leads down the opposite bank through Sir Hugh Massey's grounds, and I do not at this moment recollect any example of more attractive river scenery. The wide, deep, clear river, is for more than a quarter of a mile almost a cataract, and this to an English eye must be particularly striking. It is only in the streams and rivulets of England that rapids are found, the large rivers generally glide smoothly along without impediment from rocks. The Thames, Trent, Mersey, and Severn, when they lose the character of streams and become rivers, hold a noiseless course; but the Shannon, larger than all the four, here pours that immense body of water, which above the rapids is forty feet deep, and 300 yards wide, through and above a congregation of huge stones and rocks, which extends nearly half a mile, and offers not only on unusual scene, but a spectacle approaching much nearer the sublime than any moderate sized stream can offer, even in its highest cascade. None of the Welsh waterfalls, nor the Griesbach in Switzerland, can compare for a moment in grandeur and effect with the rapids of the Shannon.

"To the lover of the picturesque, the banks of the Shannon, between Portumna and Banagher, present little that is attractive, but to other minds there may be an interest of perhaps a higher kind. We are navigating in a steam-vessel a river here 130 miles from sea, and we know it to be navigable nearly a hundred miles higher. Its volume appears to be as great as when we saw it at Limerick; it is several hundred yards broad, and twenty and thirty feet deep. What a body of water is this! What are the Thames, the Medway, the Severn, the Trent, the Humber, the Tweed, or the Clyde, 130 miles from the sea? I am not sure if they exist at all, or, if any of them do, they are but brawling streams for the minnow to sport in. There is, in fact, an approach to the sublime in the spectacle of such a river as this, and the feeling receives aid from the character of its banks. There are wide and apparently interminable plains uninclosed, almost level with the river, bearing luxuriant crops of herbage, and feeding innumerable herds. We see scarcely any habitations, no villages or hamlets, and no road or traffic on the banks. The meadows of which I speak, extend on both sides of the river, through the greater part of its course from Banagher to Portumna. These meadows are all overflowed during the winter, and are let for grazing at a very high rent. The views on this part of the Shannon, brought forcibly to my recollection the banks of the Guadalquiver, between Seville and Cadiz. Killaloe I found an improving town; this improvement arises from several causes, but chiefly is owing to the spirited proceedings of the Inland Steam Navigation Company; a company whose objects are most closely connected with the improvement of Ireland, and which are too important, and too vast to be left in the present infancy of the establishment to private exertion, or even to public patronage. The improvement of the navigation of the Shannon and its tributaries, is deserving of the especial protection and aid of government."——Fortunately for the interests of Limerick and its neighbouring counties, a sum was granted, in the last session of Parliament, for improving the navigation of the Shannon; and it has been established by evidence before a Committee of the House of Commons, that in Connaught, in the course of seven years, the advance of L. 160,000 was repaid by an annual increase of the revenue to that amount, and also, that the increase in the customs and excise alone was L. 50,000 a-year, in consequence of an outlay through Mr Griffith, the civil-engineer. There can be no doubt of the financial advantages which must result from a full dilatation of this great leading artery, which flows through the heart and trunk of Ireland, with which smaller and tributary veins will in consequence have a free and unembarrassed connexion. When the amount of expenditure on the English inland navigation, and that on the Caledonian Canal, with the enormous sums expended (and very judiciously too) on the canals in British North America, is considered, it is but an act of common justice to Ireland, that there should be no niggardly economy in giving full development to the resources which she possesses, by facilitating the improvement of Ireland, and water communications. Nor, indeed, should legislative measures, though apparently affecting mere local interests, be considered essentially as such; weighty imperial considerations are also involved in them. The promotion of those habits of industry and civilization, which must naturally result from giving increased intercourse with markets to the inhabitants of two millions of acres on the banks of the Shannon, are a national, not a merely territorial benefit, directly influencing the morals and the prosperity of the people of the British Empire at large. May the words of Mr Fitzstephen French, at the conclusion of his speech in Parliament during the last session, on the Earl of Kerrey's motion respecting the improvements of the Shannon, prove prophetic!

> "Nature has done her part, let man do his; let not this magnificent river longer be permitted to remain, neither contributing to the convenience, nor adding to the wealth of the nation; let the few obstructions which now remain to its navigation be removed; the elements of traffic are in abundance; the busy hum of commerce will soon succeed to that dreary stillness that now marks its wide waste of water; internal intercourse will be established, and the national resources of the country will be developed; respect for the laws, peace and prosperity, will succeed to illicit distillation, discontent, and disturbance; a turbulent pauper population will be converted into an orderly community, into a profitable class of consumers; the impulse given to our agriculture will be communicated to your manufactures; the rising prosperity of Ireland will be fostered, while the meridian greatness of England will be secured; and if it is necessary to say more, I would call on you to recollect, that all this, so practical in its nature, so easy in its execution, so trifling in its expense, will be permanent in its result."

The mere local traffic on the Shannon is most important; the free interchange of potatoes and turf alone is a commercial object worthy of a considerable outlay, when it is remembered that potatoes constitute the food of the Irish people; that their bulk and weight render the carriage of them by land to any great distance almost impracticable, and that there is often a failure or scarcity of these articles of primary necessity and general consumption in one district, when they are abundant in another. Their unimpeded transit, too, to the metropolis, where the demand for them is so extensive and regular, is no trivial consideration; for while it relieves the population in want of the supply, it creates a remunerative price to the producers in those districts, where otherwise, from want of channels of communication, they would be comparatively valueless. Local distress, arising from partial failures of the staple crop, can hardly occur within reach of the Shannon, whenever the contemplated improvements in its navigation shall have been completed, besides the immense advantages that must ensue to the districts through which it flows, by the export of cattle, grain, &c. from the harbours on the one hand, or by transmitting them through the interior to the metropolis on the other.

The conveyance of turf also, which, though generally speaking abundant on the banks of the Shannon, is scarce in some districts at Killaloe, where the convenience of steam-navigation brings it speedily from those places where it is abundant. The turf trade alone is very considerable ; L.10,000 a-year is calculated to be the annual cost of this species of fuel alone in Limerick.

Four or five miles above Limerick, on the banks of the Shannon, a Scotch distillery company, Messrs Steele and Brown, have set a useful and spirited example in the reclaiming of a large tract of bog, from which they cut away, for the use of their distillery, under the guidance of a Scotch superintendent of great ability and zeal, large quantities every year. These gentlemen employed last year, during the turf-cutting season, 380 men at 10d. per day ; 20 women at 6d. ; 84 able boys at 8d. ; 120 young boys at 5d. As the work people cut away the peat, the manager has it levelled, and laid down with oats and grass seeds, and there are now some good meadow-fields on this tract. The whole of this bog, consisting of 184 acres, is divided into rectangular divisions of about six acres each ; and some of these, by their green, grassy, and smooth appearance, are ornamental to the neat house and excellent garden occupied by the superintendent. The roof of this house, based on the argillaceous subsoil, at a depth of nearly twenty feet below the original surface, was hardly visible at first from the river, until the peat was cut away, leaving to the spectator's view a commodious house, with suitable offices, soon afterwards covered with the vine and the *pyrus japonicus ;* and in four or five years from the commencement of the operations there, presenting to his eye an excellent garden, surrounded by a high and close-set thorn hedge, kept in the best condition, and containing, besides the ordinary kitchen vegetables of luxuriant quality, some choice flowers of American origin, many of them the usual occupants of the greenhouse, but here flourishing in the open air in the peat soil which they love. The portion of ground devoted to this garden, like the other reclaimed parts, has not been sunk to the argillaceous subsoil, as the fibrous matter, the usual refuse of the peat, and immediately incumbent on the subsoil, is a dry, useless matter, which Mr —— covers over with a light coat of bluish clay, pulverized by the action of the weather, which, incorporating with the peat, makes a soil peculiarly good for a garden. The example of bog improvement afforded here is well worthy of imitation. Mineral treasures abound in some parts of this county; coal, copper, iron, and lead, have been discovered. In the barony of Kerry, which is remarkable for its wheat crops, a lead mine was worked several years ago, but was discontinued. What is, perhaps, of more real importance, culm abounds at Loughgill, and other parts of the western division. The bones and horns of the moose deer have been found in the bogs of Limerick. The perfect skeleton of one of these enormous animals, completely put together, and presented by Archdeacon Maunsell to the Royal Dublin Society, now stands in their fine museum, a splendid specimen of a member of the animal kingdom unknown in modern times.

The city of Limerick ranks in population as the third city in Ireland, containing about 70,000 inhabitants; and its trade is important, as appears from the following return made to Parliament in 1830.

*Principal Exports from the Port of Limerick.*

| Year ended 1st Sept. | Beef. | | Pork. | | Butter. | Bacon. | Lard. | Barrels of | | | | | Flour. | Oatmeal. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Wheat. | Barley. | Oats. | Beans | Rape Seed. | | |
| | Tierces. | Barrels. | Tierces. | Barrels. | Firkins | cwt. | cwt. | | | | | | cwt. | cwt. |
| 1820 | 2432 | 557 | 5259 | 12,369 | 35,505 | 12,672 | 781 | 44,366 | 4,035 | 279,862 | 50 | 1,111 | 1,270 | 80 |
| 1821 | 2651 | 161 | 5686 | 8,989 | 45,573 | 23,797 | 707 | 113,532 | 17,726 | 306,423 | | 15,860 | 6,589 | 13,83 |
| 1822 | 2101 | 68 | 4548 | 9,361 | 42,869 | 12,106 | 516 | 102,593 | 2,434 | 155,344 | | 13,516 | 740 | 2,86 |
| 1823 | 2366 | 289 | 3627 | 8,999 | 54,473 | 4,316 | 258 | 92,753 | 3,545 | 172,289 | | | 1,412 | 1,27 |
| 1824 | 3138 | 520 | 4974 | 9,354 | 70,475 | 11,520 | 1257 | 54,678 | 6,502 | 231,638 | | 21,704 | 172 | 2,71 |
| 1825 | 2654 | 258 | 4417 | 9,088 | 64,217 | 19,750 | 2631 | 60,665 | 12,484 | 364,020 | 40 | 10,045 | 3,914 | 60 |
| 1826 | 2819 | 388 | 6109 | 5,403 | 51,581 | 15,550 | 1780 | 51,555 | 13,533 | 290,957 | 823 | 4,593 | 2,796 | 50 |
| 1827 | 1643 | — | 6474 | 5,924 | 68,517 | 33,370 | 3328 | 73,913 | 7,798 | 283,346 | 1593 | 2,887 | 1,720 | 3,61 |
| 1828 | 1376 | 146 | 5965 | 4,198 | 83,038 | 39,030 | 4260 | 150,558 | 8,607 | 446,290 | 4070 | 335 | 6,823 | 7 |
| 1829 | 1329 | 221 | 9176 | 6,962 | 76,382 | 46,160 | 5240 | 115,788 | 11,310 | 234,514 | 3603 | | 19,762 | 9,0 |

Within the jurisdiction of the city are thirteen parishes, occupying an area of about 25,000 British square acres; and the town itself is divided into the old and the new town—by some into three distinct parts, the English town, the Irish town, and Newtown Pery. The latter is handsome, and comprises the wealth, fashion, and commerce of the place, and presents a striking contrast to the wretchedness observable in many parts of the old town and the liberties. When Dr Campbell published his survey in 1777, the population was not near one-half of its present amount, crowded into twenty-seven streets. There are now seventy streets, the principal one in the new town, nearly a British mile in length, and innumerable lanes. The principal manufacture carried on is that of gloves for ladies' wear, which are of so superior and delicate a texture, that they have obtained a merited and widely spread celebrity. It is greatly to be wished that the linen trade were more successfully carried on at Limerick, the soil of the county being peculiarly favourable to the growth of flax, and labour being so abundant and cheap in the city and the country. The linen trade, at least the growth of flax, is now increasing rapidly in the north of Ireland. The quantity of seed sown in the spring of the present year has greatly exceeded expectation, and, compared with the quantity sown three or four years ago, is surprisingly great; but the flax is principally sent to be spun in the spinning steam-mills of Scotland. A *few* power-looms, however, are now in Belfast, though not yet in Londonderry, where great quantities of the raw material are brought into the market for exportation. On the falls of the Shannon there are the finest sites imaginable for water-mills, which, with the abundance of hands able and willing to work, would, one might suppose, induce the manufacturer to settle there. Great Britain pays about a million and a half annually to continental nations for flax, and L.200,000 for flax seed, though a great part, if not all of the quantity sown in Ireland, could be produced in the counties of Limerick and Tipperary alone. No trade can be more desirable than the linen manufacture for the Irish labourers, as it employs women and children as well as men; and as to the saving of flax seed in the mild climate of Ireland, there can be no substantial obstacle to it. The general indisposition to save the seed in Ireland, seems as wanton a waste as it is a severe pecuniary loss to people little able to afford any avoidable cost. The same may be said of clover; an immense proportion of that which is imported from England is faulty, and does not grow, yet the Irishman does not often save it himself, even in the finest seasons, and though his crop happens to be clean.

There is a good deal of fishing on the Shannon, which abounds with salmon and trout; but illicit and most destructive practices do not appear to be yet sufficiently restrained. The quantity sent to Dublin, and thence to Liverpool, is not half so great as it might be under a well regulated system of police superintendence, nor equal to that from other rivers in Ireland comparatively inconsiderable, fed as this great river is by so many streams, and expanding itself into such numerous fine lakes, in which the fish find suitable nurseries for depositing their spawn. Eels, pike, and perch, are also abundant, the latter are taken at the entrance of Lough Derg, at Killaloe, in great numbers, by nets attached to stakes. The boats which the natives use on the lower Shannon to the very mouth where a heavy and agitated sea so frequently prevails, are the Celtic corachs, with the substitution of strong tarred canvas for skins. These rude machines can be made for L. 2 or L. 3 each, and these, from their extreme buoyancy, will safely encounter a sea which would annihilate a more artificially and regularly constructed wooden boat. They are worked like canoes by one, two, three, or four men, sitting steadily along the centre, and working two paddles each, while they must observe the greatest caution in preserving the trim and balance of this frail substitute for a fishing-boat. Their rate of rowing is rapid; no ordinary boat can keep near them in rowing matches, which take place at the annual regatta, and sometimes in weather when no other boats could make way. They are to be seen in great numbers on the Clare side of the river, at Kilrush, and also at the harbour's mouth, where they perform all the business of pilotage on the Atlantic, when the strongest and best built wooden boats would be useless on so rocky and dangerous a coast.

In the History of Limerick, by Messrs Fitzgerald and MacGregor, it is said (*we think, however, somewhat credulously*), that "the fearless navigator of one of these corachs, when he spies a rent in it as it mounts the wave in a storm, usually puts his foot through the hide while he has to stop a second and third opening with his wig and breeches, and by these simple expedients he generally conducts his little bark in safety through tempests of the most terrific description."

We shall conclude this sketch with a short story of one of our own countrymen, from part of the work just referred to, which treats of the topography and antiquities of Limerick.

"Over the eastern entrance in John Street was displayed a coat of arms handsomely cut in stone, with the following quaint inscription:—

'Sursum cor.
Johannes Murray, Aberdonensis,
Erected this gate at his own expenses.
Johannes Sinclair Sculpsit, 1693.
Memento mori.'

"This worthy Caledonian appears not to have been gifted with the usual prudence of his countrymen. He had been a publican, who, having saved a little money, expended a considerable sum in building this gate; he was soon after so much reduced, that his goods were distrained for the payment of the Excise duties, when a humorous officer of the Revenue subjoined the following couplet to the above lines,—

'Johannes Murray had he been wise,
Would have kept his money to pay the Excise.'"

D.

---

## ON THE APPLICATION OF STEAM TO THE PURPOSES OF HUSBANDRY. NO. III.

In resuming the subject of steam husbandry, we were in hopes that in this paper we should have been able to depart from the speculative character which pervades the two articles which we have already written upon it, and to have entered into something like practical detail. In forming this expectation we confess that we have been at fault; the subject progresses, indeed, but with a tardiness corresponding to the lack of support which the agricultural body has as yet vouchsafed to this application of physical science. The *monied interest*, ever alive to their own concerns, are moving heaven and earth, by means of the universal introduction of mechanical conveyance on railways, to repeal the corn laws; but the *landed interest*, supine and indifferent, have taken no steps to provide for that immense charge from decreased consumption, which the sweeping away of the horses now employed in the public carriages of the country will in a few years occasion.

In taking up this subject, we were well aware that we should have to advocate it in the face of much opposition. Nevertheless, it is our encouragement for proceeding, that we are convinced the said opposition has no stronger foundation than ignorance and prejudice, both of which will quickly subside before the first successful introduction of the steam plough. Of the agricultural system now in use throughout our triple kingdom, it can be more truly said than of any other, that there is "*something rotten*" in it. Whilst all the other producing classes of our fellow subjects have cheapened their respective processes of labour, the agriculturists alone have not reduced theirs, have not kept them stationary, nay, have actually multiplied their expense. By the returns to the late Board of Agriculture, it appears that the expenses of cultivation almost doubled between the years 1790 and 1813; whilst from a comparative statement now before us of the total annual expenses of cultivating 650 acres of land, 450 arable and 200 pasture, it appears that in 1790 they amounted to L. 793, 8s., and in 1834 to L.1231, 12s.; that is, an increase between these periods took place to the extent of 55 per cent. Now, making every allowance for the discouragements heaped upon the science of practical agriculture, this is not what it should be; more especially, since the produce, stock and crop, of the said 650 acres in 1790, amounted in value to L. 1852, 18s., and in 1834 only to L. 1984, 16s. In pursuit, therefore, of the objects which lie before those who truly desire to speed the plough, it will be their honest and patriotic course to write neither *with* nor *against* the agricultural interest, but *for* it. This last is the only method by which writers on agriculture can benefit the science; and we trust that there are not a few who will gird hemselves to the task, on the one hand, of unmasking with an unsparing freedom the ruinous and fatal policy by which the landowner and the legislature combined have ground down the face of our tenantry into beggary and degradation; and on the other, of urging on, through good report or bad, the adoption of

[illegible]

those *cheaper modes* of husbandry which alone will create a spirit of life within the ribs of our agricultural death.

One of the greatest evils under which the country labours, is the circumstance that our powers of production and our powers of consumption bear no proportion to one another. This circumstance has arisen from the unrestricted, almost unbounded development of our manufacturing industry, whilst the same has not been provided for by a judicious corresponding increase of internal outlet. Instead of the burdens having been taken off which have fettered and borne down agricultural activity, and which would have permitted the profuse use of conveniences in a ratio equal to their cheapened multiplication, a system has been pursued which has limited expenditure to necessaries, with mutual ruination to grower and consumer. Bread raised under a system of cultivation which has made it dear to the buyer, and yet unremunerative to the seller, has cramped and deranged all domestic transactions; whilst the privilege which certain of our producing classes, from self-avaricious views, have obtained, of carrying on an unprofitable foreign barter, has vastly aggravated it, by its being purchased at the loss of the custom of large masses of their fellow producers, whom their short-sighted policy has cast into idleness and destitution.

This productive cause of agricultural distress,—and through agricultural, of national distress,—is now beginning to be perceived and understood by all classes of the industrial community. The sufferings of the farmers have been passed over session after session by the reformed House of Commons, and their complaints have heen treated by the liberal press with flippant levity and heartless ridicule, as if they were an isolated class, whose well-being or adversity has no counteraction upon society in general. The producing classes, who have but too much aided and abetted in this *social crusade*, now begin to be sensible that agricultural distress and industrial prosperity are incompatible; and that there is a great truth, which cannot be violated with impunity, in the declaration, that "*agriculture is the foundation of national prosperity in every matter by which that prosperity is produced.*" It was remarked during the course of the contests at one of the late general elections, by an evening paper which has ever taken a manly and

Christian stand in defence of our home interests, and the common weal of the great body by whose labour the nation is clothed and fed, that "*every vote given by a farmer to a —— candidate, was a shove to his own children on the road to the workhouse.*" This remark, which we have since seen verified by the rejection of every measure which contemplated agricultural relief, the operatives of every denomination now perceive to be equally applicable to themselves. If the farmers' children crowd the road to the workhouse, they see that it is in company with their own. To shew that we make no over-statement in this respect, we will make one or two extracts from the published replies made by the central committee of the hand-loom worsted weavers of the West Riding of York, to Mr Poulett Scrope, M. P., a disciple of the free trade and anti-corn-law school of political economy, and brother to the President of the Board of Trade.

> "You, Sir," observe the committee, "live in an agricultural district, and we dare say you have seen a vast number of ragged or half-clad agricultural labourers and families. What is the cause of that? Is it scarcity of cloth, cotton, and worsted pieces? No; it is their poverty, want of money to go to market with. The whole cause of their misery and ours too, is, that the laws of this country have ceased to protect industry. They tax it, but they do not protect it—they protect capital, but they will not tax it. If your principle of free exchange be a good one, why do you not follow it up? Why prescribe low duties, or any duties on foreign imports of corn? If our agriculturists have a claim for any protecting duty at all, they certainly have that claim to the full extent of the difference between the heavy taxation of this country, and the low taxes of the continental growers. And if, even with such a protection as they now have, the British agriculturist cannot get on, it is for you as a legislator to inquire whether there are not other causes for the depression he endures in common with all the industrious producers of the country? Revise, then, the corn laws if you can, but do not expose the British farmer to ruin, and deprive us of our most certain and best customer. The fact is, that a great change has taken place in the public opinion as to the competition in corn. The election banners of the parties who keep up this cry are modified very greatly, as we have lately seen. It is no longer "No corn laws," but "A revision of the corn laws." *Five shillings a bushel has convinced them at last;* and what the *bushel* is doing as it respects agriculture, the *yard-wand* will soon do for manufactures; it will be seen at some time not far distant, that if John Bull had been taking care of his own family, instead of gossiping with *Miss Free Trade* over the channel, or studying political economy with Miss Martineau at home, he would have been better employed. You profess to be a friend to the working classes, and that you labour both in Parliament and through the press to better their condition—we are compelled to doubt your philanthropy; your system seems to be too go

neral for us; we look to Britain, you to the world. *You overlook Britain.* We can easily conceive that foreign corn may appear to be cheaper than English, and yet be dearer in reality. We pretend not to dive into these mysteries, but we know that when bread was dearer we could get more of it, and when clothes were higher priced we had more on our backs. Perhaps there may be some truth in the opinion, '*Prices are only imaginary;—that article, be it what it may, which you have the means of creating, is dear to you if you buy it.*' So, perhaps, although we seem to get our corn of the Poles twenty shillings less than we give the English farmer for his, yet, perhaps (we leave this to casuists) the nation would have been thirty shillings richer if the additional quarter had been grown by the junction of British labour with British soil; instead of being purchased at an *apparently* low price of the Pole—the money, the thirty shillings, would have remained at home, and we should have had the corn as well. We have no wish to hurt the British corn grower; we know when he thrives he is our best customer. But as to the Pole, why, those vassals make their own clothing, and need little or nothing of ours. It would seem, if we understand you right, that your object is eventually that Canada shall grow all the corn for England; that our soils shall gradually go out of cultivation, and that we shall become the workshop of the world; there is no stopping short of this, if your principle be carried out. Now, we wish not to be instrumental in thus hurrying our country to inevitable ruin. You agree with us 'in foreseeing danger to Britain from her becoming dependent to any large extent on foreign grown corn,' and from this conviction you press on your Canadian scheme. Now, tell us is there any security that Canada will long continue one of our 'outlying counties?' If not, what fools would our government be to discourage the growth of corn here, for the sake of encouraging its growth there.—Just to make a few speculations answer for your friends! It would be running the risk of national ruin for the purchase of a butterfly. We are in hopes the landowners will open their eyes, when they read the correspondence we have got as near head-quarters as may be. *You* speak right out; your brother of course would be restrained by official secrecy. —It seems quite plain the war is against English *land* as well as against English *labour.*"

We hope that the sentiments which now possess the mind of the great majority of the operative classes in England, will be laid to heart by their fellow-labourers in Scotland. It is to the *restoration of British agriculture to a state of prosperity* that the working classes must look as the mean by which once more their labour will be rendered remunerative, and industry blessed. Let us now lay shoulder to shoulder to remove these causes which are rapidly destroying the independence and comfort of that class whose industry has produced the chief riches of the state, whose poverty deprives the manufacturer of his best customer, and whose ruin will be the ruin of the whole of our industrial orders.

The great object which it becomes the legislature, the landowner, the land-occupier, and all others who desire to promote the welfare of the country, to turn their attention to, *is the readjustment of internal production and consumption.* This is alone to be accomplished by restoring the agricultural classes to the condition of prosperous consumers. To do this, various legislative ameliorations must be had recourse to; but the most extensive method of benefiting the agriculturist will be to reduce, as far as possible, the *cost of cultivation.* The same power which, partially applied, has to such an amazing extent multiplied and cheapened the *conveniences* of life, must be so extended as to multiply and cheapen the *necessaries* of life. To the application of steam to general purposes of agriculture and inland transport on common roads, we look as the most effectual and permanent means of restoring the prosperity of British agriculture. To the former as the means of reducing, to a very large extent, the expenses of working land; to the latter as a means of getting rid of all those heavy taxes which the maintenance of the turnpike-roads and highways of the kingdom lays upon food.

Having already, in two previous articles, claimed the attention of the agriculturists of Scotland to the importance of a *legislative consolidation of the conveyance of persons, letters, and parcels, for the service of the State,* whereby, in addition to providing for the great change which the displacement of the 600,000 horses, now employed in carrying on our internal traffic, must necessarily produce, as regards consumption, we should have a uniform cheap and rapid system of national communication, a reduction of taxes and poor-rates, a vast increase of manual employment, and a distribution of capital; and farther, having the prospect that this plan will come under the consideration of a committee of the House of Commons during the next session of Parliament, we shall only advert to it here, and proceed to make some further observations on the importance and utility of extending steam to general purposes of husbandry.

The agricultural labour of Great Britain and Ireland, so far back as the year 1814, was calculated, from vast returns, to give employment, and to afford support, to a full third of the then population; and the annual produce of this labour was estimated to amount in value to L. 216,817,624. This sum may be divided into three distinct arrangements, viz., 1st, the portion appropriated for the food of man; 2d, the portion appropriated for the food of animals, essential for the food of man; and, 3d, the portion appropriated for the food of animals, not essential for the food of man, but used in raising and transporting that food. Now the latter, adopting the data furnished by Dr Colquhoun, is as follows:

| | |
|---|---|
| 1,800,000 horses, costing for their annual keep, per head, L. 29, | L. 52,200,000 |
| Add to this the ⅛th of L. 24,000,000 for average loss of capital sunk in horse-purchase, at L. 13 : 6 : 8 each, | 3,000,000 |
| Ditto for taxes, farriery, and other incidental expenses, L. 3 per head, | 5,400,000 |
| Interest upon the whole at L. 5 per cent. | 3,030,000 |
| | L. 63,630,000 |

Here, then, we have the enormous sum of upwards of sixty-three millions of money sunk yearly in the live machinery by which the food of the country is raised and transported. The calculation may or may not be altogether correct; but there can be no question that the displacement of animal labour, even to a limited extent, would be attended with the most important results, whether as regards the saving of expenditure, or extending the sphere of manual industry.

What portion of this L. 63,630,000 is expended on the horses used for agricultural purposes, we leave our readers to determine;* we would say not less than one half. M. Dupin, founder of the Mechanic Institute of France, in a comparative estimate of the amount of animate and inanimate force applied to agriculture in France and Great Britain, states, that in the latter country it is as follows:—Human race, 5,000,000, equivalent to 2,132,446 effective labourers. Horses, of full growth, 1,250,000, equivalent to 8,750,000 labourers. A noble author, who ranks high as an authority at home, makes the brute labour employed in our husbandry to be ten times more than the human. Taking the medium, that a horse will do the work of six men, the suppression of animal force will, upon an approximating calculation, save nearly two-thirds of the annual expense of raising the food of the country. The following statement may help to put the matter in another light:—*One steam plough* v. *two horse ploughs*, for a period of ten years, and both ploughing the same quantity of land, viz.—

---

* We have no means of ascertaining accurately the number of horses employed in husbandry, but we have ascertained correctly the *real* cost of their maintenance on farms in Scotland. A man and a pair of horses cost a farmer 3s. 6d. a-day, that is L. 63 : 17 : 6 a-year; of this sum the man receives L. 26, and the horses each costs of course L. 18 : 18 : 9.—EDITOR.

| One Steam Plough. | L. | s. | d. | Two Horse Ploughs. | L. | s. | d. |
|---|---|---|---|---|---|---|---|
| Fuel at the rate of 2½ bushels of coal per acre, . . | L.230 | 0 | 0 | Keep of four horses at L.25 per annum, . . | L.1000 | 0 | 0 |
| Cost of steam plough, . | 250 | 0 | 0 | Cost of 4 horses, L.25 each, . . . | 100 | 0 | 0 |
| Interest on capital sunk in ditto, . . . | 125 | 0 | 0 | Attendance on 4 horses, reckoned at a third of two ploughmen's work for ten years, . . | 286 | 13 | 4 |
| Ditto for ten years on L. 23, the average annual expenditure for fuel, . . . | 11 | 10 | 0 | Interest on the two latter items, . . . | 193 | 7 | 8 |
|  | L.616 | 10 | 0 | Ditto for ten years on L.100, the average annual expenditure for keep, . . . | 50 | 0 | 0 |
| The other incidental expenses balance each other. |  |  |  |  | L.1630 | 1 | 0 |
|  |  |  |  |  | 616 | 10 | 0 |
|  |  |  |  | Profit in favour of steam culture, . | L.1013 | 11 | 0[*] |

But this is only the saving that would be effected by substituting steam for horse power in working the plough. When it is taken into account that the same engine, when not employed in working the plough, could be applied to carting, or thrashing, &c., the saving upon the whole would be considerably higher.

Considering that the subject of steam husbandry has already advanced so far in Scotland, that the Highland and Agricultural Society, with the public spirit that has always characterized that distinguished body, have it in contemplation, in conjunction with local societies, to offer a premium of several hundred pounds for an effective steam-plough, we will take the liberty to suggest that the premium, when completed, should not be offered to the machinist who shall produce the best steam plough, but to the first joint-stock company for building steam-ploughs and hiring them out, that shall enable the farmers of any given district in Scotland successfully to commence this new system of cultivation. Were steam-ploughs left to be introduced by individual farmers, in the present dearth of agricultural capital, the outlay and the obstructions which must necessarily attend their first operations, would retard their general use for a length of years.

---

[*] We should calculate the matter in this way, which very nearly brings out the same result: Keep of four horses at L. 18 : 18 : 9 each a-year, for ten years, L.757, 10s.; cost of four horses at L. 25 each, L. 100; wages of two ploughmen at L.26 a-year each, for their time is wholly occupied with the horses, for ten years, L. 520; interest on the two latter items, L. 310; interest on the keep of horses, L. 37 : 17 : 6. In all, L. 1725 : 7 : 6, or L. 1[illegible], 17s. 6d., in favour of the steam plough.—EDITOR.

But were companies for building engines for purposes of husbandry, and for hiring them out, formed in all the provincial towns and villages in Scotland, we doubt not that, in the course of five years from this date, a very considerable portion of the arable surface of the kingdom would be cultivated by mechanical agency. The formation of such companies ought to be a matter of primary importance with each of the local agricultural societies; and in a country abounding with such rural enterprize and skill as Scotland, we trust that this hint will not be thrown out in vain. The mechanical difficulties which beset the application of steam to the working of the plough are by no means so great as those which attend its application to the running of vehicles on turnpike roads. To construct machinery of so complex a nature, that it shall give velocity to so ponderous a body as that of a carriage loaded with passengers, to the rate of from fifteen to twenty miles an hour, is very different from the machinery required for impelling a ploughshare at the rate of six miles an hour. During the last spring, we had more than once an opportunity of seeing the model of a travelling steam-plough, constructed by Mr Thomas Gibbs, which appears extremely well suited for the purposes required. The same ingenious individual has a plan for working the present plough by means of towing ropes connected with steam-engines, placed at each headland. We have no doubt that either of his plans would be found effective, if carried into practice. We have also seen an admirable design for a steam-plough by Mr John Upton, an engineer of forty-five years' practice, and who is also a farmer of considerable experience. Mr Upton has been engaged in constructing various important public works, and being a thorough mechanic, there is perhaps no man in the kingdom better qualified to assist, by his ingenuity, the prostrate interests of the agricultural community. We subjoin his address, that, in the event of any companies for steam husbandry being formed in Scotland, he may be applied to.*

As it has always been our opinion that steam husbandry will owe its general introduction to that necessity of resorting to a cheaper mode of raising food, which shall be produced by the fall of prices in grain, consequent to the general introduction of steam-carriages on common roads, it will not be out of place to mention here the progress which has been made in facilitating mechanical locomotion since the date of our last paper. In the session of 1831, a select committee of twenty-nine members of the House of Commons,—comprising Mr Jephson, the chairman, who is distinguished for his mechanical knowledge, Mr Davies Gilbert, then President of the Royal Society, Sir George Clerk, Sir George Staunton, Sir M. W. Ridley, Mr Bennett, Mr Mackinnon, Right Hon. Frankland Lewes, Mr Hodges, and other agriculturists,—after closely investigating the subject for three months, and examining the first statistical and engineering authorities, reported, that sufficient evidence had been adduced to convince them, that "the practicability of running steam-carriages on common roads was fully established;" and that "the substitution of inanimate for animal power in draught on common roads, is one of the most important improvements in the means of internal communication ever yet introduced." They further reported, that steam-carriages "will become a speedier and cheaper mode of conveyance than carriages drawn by horses, and that they will not act on roads so injuriously as the feet of horses;" but they added at the same time, that "*tolls had been imposed upon steam-carriages which would amount to a complete prohibition.*" In consequence of the imposition of these tolls, Mr Gurney had to stop running his steam-carriages between Cheltenham and Gloucester, after a trial of four months, during which time they had accomplished 4000 miles, and carried 3000 passengers, without any failure in the principle and practical working; and notwithstanding a recommendation on the part of the committee, that "legislative protection ought to be extended to steam-carriages without delay," these tolls still amount to a complete prohibition of them. There is now, however, a prospect that the obstacles to the general introduction of steam carriages on all the great thoroughfares of the United Kingdom will shortly be withdrawn. During the last session, Mr Mackinnon made a motion, "that a Select Committee be appointed to consider the propriety of consolidating the several turnpike trusts, and raising some other revenue for the support of the road than by tolls, and other matters relating to turnpike trusts;" and the Chancellor of the Exchequer in reply, informed Mr Mackinnon, that if he would withdraw his motion for the present, no opposition would be made to him early in the next session of Parliament, to the House granting a committee in accordance with the motion just made. We desire to direct the attention of the agricultural associations to the propriety of strengthening Mr Mackinnon's hands with petitions on this matter. The relief to the agricultural interest, however trifling, that would arise from the abolition of tolls, statute labour, and composition, would always be something; whilst the adoption of the proposal which we have advocated in the pages of this Journal and elsewhere, of uniting the conveyance of passengers and parcels with the *post-office*, would bring in shortly a *new revenue*, which would permit the removal of *every impost* now affecting the cost of cultivation; and consequently, provide equally for that repeal of the corn laws, which the displacement of brute labour will occasion, and for the amelioration and benefit of all classes connected with the soil. Another circumstance which has conspired in a very powerful degree to check the introduction of steam conveyance on common roads, is the prevailing mania in favour of railway communication; but this feeling, we have little doubt, will at no distant period be transferred from mechanical locomotion on iron, to mechanical locomotion on flint roads. There is every reason to believe that the Liverpool and Manchester Railway, which was constructed almost exclusively for the transport of heavy goods, and which is indebted for the one-half of its annual receipts to the transport of passengers, is in any thing but a flourishing state. Nevertheless every newspaper is crowded with the advertisements of railway speculations; and during the course of the two last sessions, we have seen, *in the face of the report of the select committee above quoted*, the sanction of the Legislature given to two schemes, which must terminate in the entire loss of the capital invested in them! The railway system, whether viewed as a proposed *monopoly* by the monied interest of the land conveyance, or as a means of depreciating the value of all property situated upon the great lines of the traffic of the kingdom, is a premeditated conspiracy against the interests of the landowner, the canal proprietor, the coachmaster, the carrier, the innkeeper, and all others in any way connected with, or dependent upon, the present systems of inland communication; and, as the determined opponent of monopoly of every kind, to which we trace as a first cause the breaking up of the happiness, the prosperity, and the peace, of the great body of our producing classes, whether agricultural or industrial, we are rejoiced at length to find, that an honourable member of the House of Commons, Mr Baring Wall, has had the courage, and let us add the patriotism, to put upon the notice-book for next session, that he will move for a "select committee upon the state of inland communication by railroads and canals, with a view to refer all plans to a Board under the control of Government."

---

* Mr John Upton, agricultural and locomotive steam-engine manufactory, New Street, Southwark Bridge, London.

In addition to the impulse which these committees, and the legislative measures which will flow from them, will give to steam conveyance on common roads, there is a very powerful company now being formed in London, for the purpose of supplying a cheaper and more durable moving power for locomotive purposes, whether commercial or agricultural. This company, when finally organized, will have auxiliary establishments in all the principal towns of the United Kingdom, in order that the facilities which it shall be the means of affording for the displacement of brute labour may be simultaneous. As regards commerce, the object of the company will be to build the most approved engines, whether for general conveyance on common roads, or for water communications. As regards agriculture, it proposes to fabricate machinery for all the various purposes of husbandry. Of these machines, the former will be hired to the carrying establishments at a mileage rate, the latter to farmers at so much per job. We understand that the company is strongly supported by the heads of the carrying trade in London; and we trust that the landed interest, and the various agricultural associations, will see it to be for their advantage to give the company the cordial and strenuous support which it so well merits to receive.

In addition to these matters, we have further the satisfaction to communicate, that the formation of the *Royal Central Agricultural Society*, to which we alluded in our last paper, and which the political changes of the two last sessions of Parliament have impeded, now progresses under most favourable auspices. Several of the leading agricultural associations, impressed with the importance of concentrating the efforts of the agricultural body, have passed resolutions expressive of the conviction "that nothing is so likely to insure such universal and vigorous co-operation as shall compel the attention of Government to the distressed condition of the farming and labouring classes, as the foundation of a general central association in London, to the proceedings of which all parts of the kingdom may have the opportunity of contributing their support;" and active steps are now being taken to enlist in this cause the services of the agricultural interest in general. It is now in contemplation to have a meeting in London on this subject, at which deputations would attend from the different local societies, prior to the commencement of the next session of Parliament; and we trust that the result of that meeting will be, that it shall no longer be a reproach upon the public spirit of the landowners, and a circumstance of the greatest prejudice to the property of the land-occupiers, that in the metropolis of a great nation, in which it is acknowledged that "*the agriculture of the kingdom is the first of all its concerns, the foundation of its prosperity in every other matter by which that prosperity is produced,*" there is no public *institution* of any kind for its protection and encouragement.

Whilst it gratifies us to record that active steps are thus being taken in various ways for the advancement of the science of agriculture, we could have wished to add, that active steps are also being taken by Parliament for the amelioration of those who live by agriculture. The liberal journals, in apologizing for the barrenness of the speech from the Throne at the close of the session, remarked, that little was to be said on the state of affairs, as "*the country was in a thriving condition.*" With regard to the condition of the handloom weavers, who are instanced "*as* *rapidly improving*," that does not appear on the face of any part of the proceedings of the meeting of the Spitalfield silk-weavers, held on the 8th of August last, "to express their dissatisfaction at the conduct of the House of Commons in rejecting Mr Maxwell's motion for leave to bring in a bill to regulate prices, and in withholding all relief for their distress;" neither does it appear from the weekly wages which a weaver can now earn at the work a majority of the weavers are employed on, as the following statement, taken from the evidence of the weavers, manufacturers, and other witnesses examined by the committee on handloom-weavers, will shew: At Aberdeen, 3s. 6d. to 5s. 6d. nett; Bolton, 4s. 1½d. nett; Dundee, 6s. to 7s. nett; Forfar, 6s. nett; Glasgow, 4s. to 8s. gross; Huddersfield, 4s. 6d. to 5s.; Lanark, 5s. 1d. nett; Manchester, 5s. to 7s. 6d. nett; Paisley, 6s. to 7s. gross; Perth, 4s. 9d. to 7s. 9d. nett; Preston, 4s. 9d. to 6s. 6d. gross; Spitalfields, 7s. 6d. to 8s. gross; Coventry, 7s. 6d. nett; Nuneaton, 4s. 8d. nett; Drogheda, 2s. 4d. to 4s. nett; Belfast, 3s. 6d. to 6s. 6d. gross. Such are the weekly earnings—gained in but too many instances by sixteen hours' hungry and thirsty toil—of this "*rapidly improving class*" of our fellow-countrymen! God knows, deeply as we commiserate their condition when we think that many of them have neither wholesome nor sufficient food to eat, nor beds better than straw to sleep on, nor clothes except rags to shield them from the cold, nor hope either in time or for eternity;* and willing as we are to spend ourselves to alter it, yet, when we think that, mainly through the instrumentality of the operative classes, all our manufacturing towns have returned men to Parliament who would willingly *bridge the Atlantic* in order to deportate the children of our soil, and hasten the day when not a *blade of corn shall be grown amongst us*, we are almost tempted to exclaim, " Let them suffer the retribution which their support of the vampire system of the heartless economists entail upon them." But of the agricultural body—two-thirds of whom at least have done their duty to their own families and those of their neighbour, by returning men who would legislate on the principle, " *Live, and let live*"—what is said? Why this,—" Even the agricultural interest is in a flourishing condition; in Scotland it is improving rapidly, and it is hoped also in England!" Whether this be so in Scotland, we leave it to our Scottish readers to determine; but that it is not so in England is proved by the fact, that, in the county of Norfolk alone, at the present moment, there are upwards of eighty sales of farming stock, and that bale-fires are nightly raised in our haggards; and this year the yeomanry of Suffolk have expressed their opinions in these indignant terms, " That the conduct of his Majesty's Ministers, and of the House of Commons, in rejecting the motions of the Marquis of Chandos and Mr Cayley, and in allowing the budget to be introduced with a measure of relief so totally inadequate to the occasion, not only deserves the severest censure of this meeting, and of all persons concerned in agriculture, but forces upon every mind the unwelcome but inevitable conviction, that the *promises of Government are no longer to be relied on*, and that the present House of Commons is *utterly unworthy of the confidence of the country*." Yet we have an auspicious foreboding with regard to the future destinies of our country. But that day will not dawn so long as the withering policy of the economists blights the sinews of the nation, and calls it *prosperity*; so long as the nostrums of the utilitarians prevail in the senate; so long as miscalled Christian philanthropy can shed tears in favour of the well-fed, well-housed, and well-tended black, whilst the billy-roller may crush the white child, and famine desolate the Irish cabin, without exacting even a sigh! Well did the Morning Herald lately put in vivid contrast the following observations, with those vain glorifications of prosperity. " The progress of rural incendiarism is alarming. Our columns, and those of other journals, bear daily testimony to the melancholy fact. To conceal the truth serves no other purpose than to prevent our ascertaining the cause of the evil to which a remedy ought to be applied. What is the cause of the dreadful prevalence of a crime so foreign to the habits of the English people in former times, and which illumines our fields in these days of "reform" and "intellect" with the desolating flames of midnight conflagration? If we cannot say what the cause *is*, we can say what it is *not*. It is not the leniency of the law, or the mild and merciful spirit in which it has been carried into effect, that has encouraged the crime of stack-burning. The law, we need not say, is a law denouncing death to the offender—a law which has for several years past been inexorably executed in almost every case of conviction; and, we regret to add, in many instances in which there is strong reason to believe that the victims of the law were innocent. Still the crime has gone on increasing. Scarcely is the dreadful work of the assize over when it bursts out afresh, and seems to defy the power of the law to extinguish it with blood. This state of things should long ere now have awakened the attention of the ministers of the Crown to the condition of the rural population. It should have convinced them that there is something rotten in the *social system*, which *political reforms*, as they are called, do not touch. There is one reform which all our liberal politicians neglect or despise,—*a reform of the condition of our labouring population*,—without which the sword of the law will be powerless to extirpate the evil, and the machinery of the gallows will be worked in vain." Yes! that reform of the condition of our labouring population we *shall* have. It only requires a union of the agricultural and the industrial classes—that union now in progress, and which the events of each succeeding day of procrastinated distress will tend to accelerate, and tend to consolidate,—and we shall have those in power who will lay their hand upon the *plough*, that instrument by which alone can be wrought out the peace and the happiness of the nation, and bid her *God speed* in a voice that shall prove omnipotent. R. B.

---

* "As a corollary to this, your Committee found that the due and usual attendance at divine worship is generally neglected; that this arose from shame, in the first instance, at appearing at church in rags; that the writings of Carlisle and Taylor have obtained a greater spread, and that the witness had *seen companies of men applauding those who have argued against the existence of a God.* But your Committee cannot in justice close their observations on these statements, without the accompanying remark, that the witness attributes this awful state of things to no innate vices and infidelity of the people themselves, but solely to that recklessness which originates in want and despair."—*Extract from the Report of the Committee on Handloom Weavers.*

## SOME ACCOUNT OF THE FAIRS IN SCOTLAND.

### No. III. *East-Lothian or Haddingtonshire.*

1. *Haddington Markets.*—Haddington, the county town, is a considerable one, containing 5883 inhabitants. It is sixteen miles to the eastward of Edinburgh, on the great London road by Berwick-upon-Tweed. It is a royal burgh, but being a country town, its trade is entirely dependent on agriculture. Its grain market, a stock one, held on Friday, is one of the principal in Scotland; and, as the town is situate in one of the finest districts in the country, the grain presented is generally of the finest quality, and fetches the highest prices. Its old fairs are now nearly gone into desuetude, and are unworthy of particular notice. The only cattle-markets in it are those established by the East-Lothian Agricultural Society a few years ago. The *first* is held on a Friday in April, the day being fixed by the Society by public advertisement. Along with a show of stock for premiums of bulls, stallions, fat cattle, and sheep of different descriptions, and also grazing-stock belonging to the members of the Society, there are generally from two to three hundred fat cattle shewn of different breeds, both short-horns and north country cattle. Should cattle be in demand in England, English dealers attend, but the principal purchasers are the fleshers from Edinburgh, though a few are picked up for Glasgow. This market is improving, and well worth the attention of those who wish to buy prime fat stock. The *second* of these markets is held on the Friday preceding All-Hallow Fair at Edinburgh. Some years ago north country dealers attended this market, but, being so near All-Hallow, it has latterly been nearly deserted. The *third* is held in December, on a Friday fixed by the Society, when premiums are awarded for different sorts of fat cattle and sheep; and also a market for fat stock is held. About the same number is presented as at the market in April. The quality of the whole stock at this market is of general excellence. The fleshers of Edinburgh and Glasgow buy them all up. The premium stock are first-rate, and would do honour to Smithfield. Their carcasses cut conspicuous figures

at the stalls of the fleshers, who purchase them for the Christmas and New Year's feasts of the gentry who frequent Edinburgh at that season.

2. *Dunbar Hiring Markets.*—Dunbar is a considerable seaport town of 4735 inhabitants, situate on the north-east point of the county; twenty-eight miles east of Edinburgh, and thirty from Berwick-upon-Tweed, on the great Edinburgh and London mail road. It is a royal burgh, and has a weekly corn-market on Tuesday. Many of the inhabitants are in the seafaring line, and engage largely in the herring-fishery when the herrings approach the Frith of Forth. The fairs in this town were held chiefly for the hiring of single farm and domestic servants, immediately after the terms of Whitsunday and Martinmas; but according to an agreement among the farmers and servants in East-Lothian, married farm-servants are hired on the farms. The few cattle that are bought and sold at markets at Dunbar, deserve no particular attention.

The ploughmen in East Lothian are married men, and their character stands high for good behaviour and expert workmen. Their wages are; a house and garden, for which they must provide a shearer for twenty days, who gets victuals. The shearers' victuals consist of oatmeal porridge and milk at breakfast and supper, and a wheaten loaf and beer at dinner. They must also provide a woman or boy, the woman being preferred, to work field-work in summer, who receives eightpence a-day when employed. Coals are drawn to them free of carriage and tolls, and they may keep pigs confined in a stye. They receive of corn, nine quarters of oats, eighteen bushels of barley, and eight bushels of pease; 800 yards along a drill of potatoes, the servants supplying the seed, but good servants are frequently encouraged with 1000 yards. As much land as will sow one peck of linseed, which may cover from eighty to ninety yards, along a fifteen-feet ridge; but on many farms this allowance is relinquished, and a guinea given in lieu. A cow is kept for them all the year round; and, where the land is so clayey that little turnips are grown, hay is given instead. There is a very good practice among the ploughmen of this county of insuring their cows, which deserve imitation. If a cow happens to die before she is nine years old, the owner is reimbursed by an insurance club among the men, to which they subscribe a small sum annually; but if after that age, the risk is the owner's. There is no money wages given. We have heard it alleged that the farm cottages in East-Lothian are inferior in comfort and convenience to what the men deserve. This might have been the case years ago, and perhaps is so still, in many cases; but the same remark would have then applied as well to farm-houses. Now, however, it cannot be denied that the style of the farm-houses is greatly improved. Farm-steadings are now of a very superior construction, and when improvements of this kind are executed, the servants' cottages are never neglected. The danger consists, in our opinion, of going to the opposite extreme of making cottages too capacious, by giving servants two-storied houses. Their furniture, in that case, becomes quite unsuitable for such houses. It is no kindness to put a man into a house which he cannot afford to furnish; and, on the other hand, useless furniture is a drain on the poor man's pocket, and a great toil to him when he unhappily has to move to a new abode. All that a farm-cottager really requires is a " but and a ben,"—comfortably floored with pavement or brick, and roofed with lath and plaster—not divided by a partition wall, but much more comfortably by the furniture, which can be arranged to form two sleeping apartments, with fire-places, one to be occupied as the ordinary cooking room, and the other containing within it a store-room for meal, potatoes, and milk.—A large window to each apartment, and a small one where the store-room should be—with an inner door on one side of a small hall or " hallan," within the outer door. An outhouse behind for the pig and coals is a great convenience. No good servant should be deprived of these comforts, nor compelled to uphold superfluities.

3. *Gifford Fairs.*—Gifford is a small village situate at the base of the Lammermuir Hills, hard by Yester House, the seat of the Marquis of Tweeddale, and is eighteen miles south-east from Edinburgh, six south of Haddington, and eighteen from Dunse in Berwickshire over the Lammermuir Hills by Longformacus. There are three fairs held yearly in Gifford, and these are the only ones of importance in East-Lothian. The first is held on the last Tuesday of March, principally for the sale of ewes at the lambing. The ewes are chiefly of the Cheviot

and black-faced breed from the adjoining Lammermuir Hills. From 2000 to 3000 are shewn mostly by the breeders, who sell their best ewes at this season, the principal buyers being the East-Lothian farmers and graziers, although some graziers attend it from different counties, who take grass parks for the summer, and feed off both ewes and lambs for the butcher. The age of the cast ewes from the Lammermuir Hills does not exceed five years, being younger than the west and north country ewes; and, being sound off these hills, they thrive well, and make themselves fat on good grass after they have fed off their lambs, while the north country ewes when sold are six or seven years old, and do not get fat. This advantage makes graziers give the preference to Lammermuir and other south country ewes. Old ewes require very fine keep to feed off. Occasionally a few lots of wethers and hoggs are shewn, but this is principally a ewe market. Very few cattle or horses are shewn at this fair.

*2d*, The second fair is held on the third Tuesday of June, at which is a good show of wethers and hoggs, with a few ewes and lambs, and occasionally a few fat lambs, from 3000 to 4000 of different kinds being generally exposed to sale from the Lammermuir Hills, and high parts of East-Lothian. The lower part of the county not being a breeding district, the sheep shewn at this fair are principally purchased by farmers from the low districts, who graze them and feed them for the Edinburgh market. Sheep from the hills are, however, seldom so full of condition as to get prime fat off the grass, but with a month or two on turnips, they come very prime to the market by New Year. The wethers from the high parts of Lammermuir, and the hoggs from the sides of the hills, coming off sound and hard land, make rapid improvement when they get to good keep in the low country. There is generally a pretty fair show of cattle at this fair, say from 400 to 500, mostly short-horns, which are not so well bred as those on the south side of the hills. They are generally two-year olds, and are mostly purchased by farmers and feeders in the low country. There is sometimes a good display of north country grazing cattle, and a few lots of short-horns are brought by dealers from the southern districts, and when the season is favourable for grass, they meet a ready demand; but this of course depends entirely on the state of the pastures, which also regulates the prices in the sheep market. Very few fat cattle are shewn at this fair, although there is sometimes a fair show of indifferently bred milch-cows. The aged cows are purchased for the Edinburgh market, and the younger sorts for country use. There is generally an excellent show of horses at this market, and numbers of buyers and sellers from Edinburgh and the surrounding country attend, and do a great deal of business.

*3d*, The third fair is held on the first Tuesday of October, when a large show of sheep, principally of draft or cast-ewes, is presented, the great bulk of them being Cheviots and black-faced—the Cheviots predominating, with a few lots of Leicester and half-bred ewes, and wethers and hoggs. The number of the whole varies from 3000 to 4000, most of them being from the Lammermuir Hills. Several of the Cheviot lots come from Gala Water, and other pastoral districts in the south, and some of the Leicester and half-breds from Lauderdale. The principal purchasers are farmers from the low parts of East-Lothian, who keep no breeding-stock, and buy in ewes at this season, and put Leicester rams to them, and their produce makes excellent lambs. The lambs from the Cheviots, or black-faced ewes bought at this fair, are lambed in March, and ready in May for the Edinburgh or London markets. Such lambs, are very superior, when allowed to suck till they attain nine and ten lbs. per quarter, when they suit the London market well, where some of them, of late years, have brought very high prices, in May and June, when lamb begins to decline in price in the Edinburgh market. This opening to the London market by steam-navigation, holds out a strong inducement to East-Lothian farmers to buy Cheviot and black-faced ewes in October, as the lambs from Leicester, and half-bred ewes, being first ready for the Edinburgh market, before May, and being much too small for London, are worth a good price in Edinburgh; but the lambs, from Cheviot and black-faced ewes wintered in East-Lothian, becoming ripe only in May or June, their weights then suit the London prices. Consequently considerable shipments are made of lambs at that season, which, without such an opening, would have to be sold in Edinburgh, at the then low Edinburgh prices.

Ewes, although bought at high prices at this fair for some years past, have paid well, principally from the high prices of lambs and wool. When they are well-wintered, and full of condition at the time the lambs are taken off, and when they are well-pastured for six or eight weeks after, they become early ready for the Edinburgh market; and thus by the sale of both lambs and ewes a great advantage is derived over the spring-bought ewes, which are much later in getting ready for the market, and must encounter the competition of stock from the high districts. Highland farmers have now found out, that light stocking pays them better than heavy, and by that means they can now send their lambs and ewes into the market nearly as early as the spring-bought ewes and lambs of the low country.

There is a pretty good show of cattle at this fair, mostly short-horns, a number of which are shewn by south country dealers, who purchase them at Jedburgh and other markets in the southern districts; the remainder are six-quarter and two-year olds bred in the country, with a few lots of north country bred cattle. If turnips are a good crop in East-Lothian, a few farmers who care not to go far from home to purchase stock, create a good demand at this fair. Very few milch-cows are shewn at this season; but those which are new-calved, or at the calving, generally meet a ready demand from the Edinburgh cow-dealers. There is also good show of horses, and a number of dealers from Edinburgh and the surrounding country attend both as buyers and sellers, and generally transact a good deal of business.

One of the East Lothian agricultural shows is held at Gifford at this market. Premiums are awarded to Leicester, Cheviot and black-faced tups and ewes, and Leicester gimmers; and there are always some very fine specimens of each kind of stock shown.

Fairs occur at North Berwick on the last Thursday in June, and the last Thursday of November; at Stenton on the last Thursday in October; and at Cockenzie on the first Thursday in November; but they are of no importance, and ought to be abolished. Linton, however, appears a very eligible situation for a market, being in the middle of the county, and on the great leading road through it. We conceive that a monthly market established there on a similar principle to those at Kelso, Coldstream, and Dunse, which we have already described, would be of essential service to the feeders of stock in East-Lothian. If it were held early on Monday morning, the dealers who attend Edinburgh and Morpeth would have time to bring the stock forward for the weekly markets on Wednesday, at both these places.

---

## ON THE APPLICATION OF THE POINTS BY WHICH LIVE STOCK ARE JUDGED.—II. TO THE SHETLAND BREED, &c.

By Mr James Dickson, Cattle Dealer, Edinburgh.

The Shetland cattle inhabit the Shetland Islands. These form the northernmost group of islands belonging to Scotland. They have a barren and wild aspect when viewed from the sea, and their interior presents little else than pools of water and bare rocks; not a tree or shrub is to be seen on them, and the herbage is as comparatively poor as their aspect is barren. The small islands, however, called the Holms, are covered with better pasture. But poor as the islands are, they contain a peculiar breed of cattle and horses both very diminutive in size. The cattle are comparatively valuable on account of the fine quality of their beef. Their symmetry is not quite correct according to the rule which we have laid down for judging cattle; the line of the back being rather hollow; the ribs are pretty round, the tail head droops, and the fore quarters and belly are fully too large. This form, which indicates starvation, may accordingly have arisen from the coldness and wetness of the climate, and the scantiness of food; for if we look at the kindly touch, the sleek soft hair, the fineness of the muscle, the fulness of the eye, and sharpness of the horn; they ought to feed pretty well; and, accordingly, they do feed fat on tolerably good pasture. Their colour is uniformly black, light red, or black and white. They are naturally the smallest breed of cattle in the kingdom, weighing generally from 16 stones to 20 stones the four quarters, and when extra fat from 25 stones to 30 stones. I have seen them fat at 14 stones or 15 stones. The beef is of the very finest quality throughout, being as small in the grain as mutton; the fat well intermixed, and the flavour most delicious. In fact, in point of quality, they are without exception the finest cattle that are bred in the kingdom. The cows are not great milkers; but the milk is very rich.

### III. To the Orkney and Caithness Breeds.

The Orkney Islands lie to the north of the coast of Caithness, which is the northernmost county in Scotland. The climate is cold, and variable, and late; but frost and snow continuing only a short time on the ground, the grass gets leave to grow. The pasturage is better than in the Shetland Islands. The county of Caithness lies generally low, and having no high land to the north, to screen the low land from the strong north-west wind, which blows almost incessantly in spring, the grass cannot be expected to be early.

The cattle of Orkney, though much larger than those of Shetland, are much less symmetrically shaped, and not so fine. The back curves above the straight line, and is narrow; the ribs are flat; the hind quarters thin; all the bones coarse, and those in the body prominent; the head droops, and the horn short and blunt. Their general symmetry and poor coat indicate them to be slow feeders, and incapable of early maturity.

The Caithness cattle are not unlike the Orkney. They have narrow backs, flat ribs, and, as a natural consequence, large bellies, and narrow chests. Many of both the Orkney and Caithness cattle are trained to work, and are kept till above seven or eight years old, when they are sold quite lean, and fattened off afterwards. They are then called "*runts*," a Scottish phrase which technically means "an old cow that has given over breeding,"—a phrase not inexpressive of the old useless appearance of this breed of cattle. I have seen these runts bought for very little money; but nevertheless they pay the feeder well, because having age, they feed rapidly on good pasture, and the beef is pretty good. A great many of them are exposed for sale at the Kyle of Sutherland market, and thence driven south to the Scotch and English markets.

Many spirited agriculturists have of late years greatly improved both the cattle and the face of the county of Caithness. There is much turnip land in this county, which being sown with turnips, enables the feeders to feed their own flock. Many of the fattest beasts find a ready market in Caithness in summer during the herring fishery. This species of national industry has increased so much in this quarter, that perhaps not fewer than 80,000 people are employed in it annually on the coast of Caithness. The fishermen make good wages, and are able to live well on butcher meat.

Should steam navigation be introduced for the conveyance of live-stock from this quarter of the country, the breeders will be enabled to feed off all their stock, and send them direct to the Edinburgh market, instead of exposing their lean stock for sale, or depending only on the immigration of fishermen in summer, for the principal consumption of their fat stock.

Improvements have chiefly been effected by stewards brought on purpose from the south country, or south country farmers taking farms in that part of the country. The Messrs Horne of Stirkoke and Langwell have Berwickshire stewards, who have set examples of management to their neighbours. Mr Traill of Ratter is one of the most spirited improvers in this county. Mr John Paterson, in what is called Lord Rae's Country, now the property of the Duke of Sutherland, has made great improvements at Leangill.

### IV. To The North Highland Breed.

In the counties of Sutherland and Ross are many breeds of cattle. The native breed is called "North Highlanders," which are scarcely distinguishable from the cattle of Orkney and Caithness; in East Ross and Cromarty, is found the large breed of Banff and Aberdeenshire; and in many other parts the "West Highlanders" are found. Of the West Highland breeds, the breed from the island of Lewis, belonging to Ross-shire, is a smaller breed than the runts of Orkney and Caithness, and it possesses very little if any better symmetry or quality. But the Dunrobin West Highlanders form the pride of Sutherlandshire. They are bred by, and belong to, the Duke of Sutherland at Dunrobin Castle; hence the name.

The Dunrobins are well known both in England and Scotland as superior West Highlanders. They attain to great size on the pastures of Dunrobin, which are considered as fine grazing land as in Scotland. I remember a lot of sixty four-year olds being shewn about twelve years ago at the October Falkirk Tryst. They had the most sprightly and splendid appearance of any north country cattle I ever saw. They shewed beautiful symmetry, straight level backs, round deep carcasses, great substance of flesh, strong fine bone, fine coats of hair, with small muzzles, quick eyes, and large sharp-pointed spreading horns. The only fault which could have been found in their symmetry was the large proportion which the fore bore to the hind quarters. They were fine fat, and would have weighed fifty-five stones the four quarters, and were purchased by the late Mr Henry Lee of Scateraw in East Lothian, an eminent feeder of cattle, for 18 guineas a-piece. Mr Lee sold them by public sale some months after, when they averaged about L.23 a-piece, as they were considered very superior animals in every respect; but on being killed they did not prove well. They wanted weight, quality, and fat to their appearance, and turned off very large hides. I have heard it maintained, that the large hides and horns evinced, that they had a dash of the Irish blood in them. In these respects, they certainly did resemble the Irish; but not at all in their general appearance. I have seen a lot of cows and young cattle of the same breed on the farm of Skelbo, belonging to the Duke of Sutherland. These I considered equal to the Dunrobin cattle. Skelbo is in excellent management. It had been improved by the late Duke as a pattern and stimulus to his tenantry. It is situate on the side of Little Ferry, and carries excellent crops of corn and turnips. I understand that Sir William Watkins Wynne of Wynnestey in Wales, purchases three-year old Dunrobins every year, and uses them for his own table after feeding them two years. The last lot of that age I ever saw sold was for twelve guineas each.

A small breed of cattle called "Skibos," are bred on the property of Skibo in Sutherlandshire, belonging to Mr Soper Dempster. They are nearly as small as the Shetlanders, but much more symmetrical and beautiful, and nearly as fine in quality of beef. The tenants on the property of Skibo have the privilege of driving those which they have to dispose of for payment of rent, to the estate of Dunnichen in Forfarshire, a property which belonged to the late celebrated G[illegible] Dempster, the "honest Scotchman," as he was familiarly called by George the Third, but now to Mr James Whitshed Hawkins, to dispose of by public auction. Thither gentlemen from all parts of the low country go to the annual sales, and give exorbitant prices for these small creatures, to fatten for the use of their own tables. Skibos are exceedingly neat, having straight level backs, pretty round ribs, small bone, sharp muzzle, keen bright eye, and fine small sharp-pointed spreading horns, with a soft thick hairy coat, and sweet touch; they possess most of the good properties of a fast feeder. Looked on from above downward, they are rather narrow, and perhaps long, for their breadth; but when extra fat, they cover the tops of the ribs well, and shew remarkably fine points. The beef is of the finest quality. These annual sales take place in the beginning of October. After being kept two winters and a summer on good keep, they attain to the weight of from thirty to thirty-five stones; and if kept on for another year, they may be forty stones. The drove consists of from 200 to 300 stots, never queys, of two and three year olds, and a few older; but the youngest fetches the highest proportionate price; and of all the colours of black, red, dun, and brindled, the black and red coloured are generally the best feeders, and the most symmetrical. The prices given at these sales are quite fanciful.

The horned cattle in East Ross and Cromarty, though like the horned Aberdeenshire, are rather smaller, and something like the smaller sized runts, and the best of them might feed, if very fat, to fifty stones; but their ordinary weight runs from thirty to forty stones. Great numbers of cattle might be fed in this district, as it is one quite suitable to corn and turnip husbandry, but ready markets being situate at a great distance, raise a barrier against their being generally fed, although many of the lots which are driven to the south are in prime condition. There is a spirited farmer who farms extensively in East Ross, Mr Archibald Dudgeon of Arboll, from East Lothian, who feeds a good many sheep and cattle, which he brings to the Edinburgh market once a-year, about May, from a distance of upwards of 200 miles. I have seen him show very superior sheep of different breeds, but the distance is too great for heavy cattle to travel without injury. What an advantage would steam navigation prove to Mr Dudgeon and others similarly situated, as a means of conveyance to a ready market like that of Edinburgh! Although the district is well adapted for feeding, it will never become an important one as such without the assistance of steam navigation, which in this quarter should be conducted in a particular manner. To use a steam-ship to advantage in this quarter, the supply should be confined to the Edinburgh market, for the want of cheap coals in that part of the country precludes the possibility of a profitable voyage to London. Driving the cattle to the London steamers at Aberdeen would knock them up when ripe fat nearly as much as to a greater distance in a leaner condition. But even under present circumstances, breeders preparing stock for dealers or feeders in the south, never can put them in too high a condition. They may depend upon it that they will be repaid for extra keep, as high condition will never be found fault with by dealers. On the contrary it will be appreciated, though from no other consideration, than that good condition enables an ox to travel well; and if well driven, much of the firmer part of the condition will remain, though part of the softer portion must of course be lost in the driving.

The North Highlanders are found in the counties of Caithness, Sutherland, Ross, Inverness, Cromarty, and Nairn.

## V. To the Aberdeenshire Breeds.

There are various breeds of cattle in the county of Aberdeen; but the kinds which more properly belong to it are three,—the polled cattle of Buchan, called Buchan doddies, the large-horned cattle of Aberdeen, and the small-horned or Brae cattle of Aberdeen.

The Buchan doddies are an esteemed breed of cattle. They are generally symmetrical; the back being straight, and nearly level, but having the top of the rump and the tail-head a little too much elevated; ribs roundish, being a little flat near the back bone. The side view is pretty rectangular, the deviations occurring by the brisket being deeper than the flank, the rump and tail-head being higher than the back and shoulder tops, and being a little light at the buttocks. When viewed from above, the back is a little too narrow, and is wedge-shaped from the hooks to the shoulder. They have a good eye, and are generally good handlers, having a strong boned frame, capable of carrying much beef, which, when ripe, is placed pretty well upon the best points. Their colours are generally black, sometimes red, dun, and brindled, with scarcely any white. Their appearance indicates substance of muscular flesh and gaiety of disposition. When fed they attain from fifty stones to sixty stones at four years' old, and some even to seventy stones or eighty stones, and in some instances 100 stones at five or six years' old. The beef is of fine quality, adapted either for the cutting up or the shipping butcher, particularly the latter, and it is always in demand for that purpose, and they find their way to every part of the south country. I once had an opportunity of seeing at Cartel Haugh Show, near Old Deer, some fine specimens of bulls, cows, and heifers. There are always some fine lots of these doddies shown at Aiky and other fairs in that neighbourhood. The last time I was in Smithfield market I saw a lot of twenty very fine Buchan doddies, which had been bred and fed near Peterhead. They fetched L. 23 a-piece, and were of as good quality as any cattle in Smithfield that day, and were early sold. They had been conveyed from Aberdeen to London in a steam vessel. This mode of conveying fat cattle to the London market is an invaluable privilege to breeders and feeders in that part of the country. Indeed, it will there entirely change the prevailing mode of managing cattle. Instead of keeping them in a lean condition for two or three years in order to prepare them for travelling by age, they will be fattened on the spot, and sent off to London. To accomplish this desirable end in a short time, and thereby insure a quicker profit, they should be fed from the moment they are dropped. This improved method of feeding will cause the cultivation of a greater breadth of turnips, and perhaps potatoes. Bone-dust will secure an abundant supply of the former; and when the London market is at command, the London prices will repay for extra feeding. Captain Barclay in Kincardineshire, Mr Stronach in Aberdeenshire, and Mr Miln of Mill of Boyndie in Banffshire, send fine well fed cattle to London.

The Brae breed of Aberdeenshire cattle is a middle-sized horned kind, of pretty good symmetry, and rather plain skinned, but they are favourites with the graziers in Aberdeen, Banff, and Morayshires, as they are clever travellers, and seldom exceed in weight from thirty stones to fifty stones when fat. They also cut well up for the retail butcher. Morayshire is not a great breeding county, the graziers purchasing these brae cattle at the markets in East Ross and Cromarty. These brae cattle are well suited for wintering on half turnip and straw, and feeding off in summer on grass. Their beef is of fine quality, and, from their moderate size, they are much liked by butchers for summer killing. I have frequently observed that no beef is better mixed, or cuts better up.

In the interior of Aberdeenshire, towards Huntly and Keith, and through many of the low-lying grounds elsewhere, is a large horned, heavy breed, called runts. They have large frames, strong bones, long legs, a gaunt appearance, smooth hair, large hooves, and the top of the head surmounted with very thick, broad, long spreading, turned up horns. The colour is generally black, with some patches of dead white about the belly and face. The muzzle is thick, and the eye dull and heavy; they stand high on the legs, are long in the body, and have great ends and small middles. They attain to fully as great weights as the Buchan doddies. Many are worked in the plough till seven or eight years of age, and then sold to be driven south or fed at home. Some of these cattle are bred by the Duke of Gordon, Earl of Aberdeen, Earl of Kintore, Earl of Aboyne, and others.

The show of the Highland and Agricultural Society, which took place in October 1834, at Aberdeen, clearly proved that the Buchan doddies are displacing these large horned runts; and no doubt properly, for they are a finer breed of cattle. There was a considerable display of bulls and cows of the doddies, and but few of the horned breed. This change in the breed is ascribed to a change of management of cattle during the winter in this district. Formerly all the cattle were housed in winter, and it mattered not whether they had horns or not, for they could not injure one another when each was separately tied up;* but now it is found better for their health, and the preservation of their travelling condition, to feed them in straw yards: (and as hatred and envy are their besetting sins, the doddies are less likely to gore one another than the horned, although even they can "give each other plaguy knocks," but not, as in the prize ring, "with all the love and kindness of a brother." The superior kindly disposition of the doddies to fatten is of itself a sufficient inducement to warrant the change. A considerable quantity of butter and cheese are manufactured in Aberdeenshire, for the Buchan cows are good and steady milkers, although the milk is not very rich. The curing of beef, for which the heavy cattle of Buchan are well adapted, might be successfully prosecuted in this quarter.

While alluding to the subject of salting beef, I cannot refrain from making a few observations on the quality of the salt which is in this country used for that purpose. It is well known that the salt manufactured in this country from sea-water is bitter and harsh to the taste. The rock-salt also is not devoid of the bitter taste. The salt from St Ubes, or what is called Bay-salt, is somewhat similar, though not so pungent. The salt, on the other hand, which is manufactured from sea-water in Holland, has not the slightest bitterness or harshness to the taste. It has a pleasant pure saline taste. It is crystallized in large tables, is quite hard and dry, and emits a jingling sound when handled in quantity. It is said that the Dutch possess some secret in purifying the salt after it is made, and to prevent this being made known, they will allow no strangers to visit this department of the salt-works. It has been suggested to bring a Dutch purifier of salt from Holland. But if there is really any secret unknown in this country, the Dutch government would not likely permit such an exportation. Now it is well known that in making salt from sea-water, the salt which is made on Sunday is very like Dutch salt, because on that day the water gets more time to evaporate. So that if more time were taken to make salt from sea-water, it would probably be as good as desired. As the process is at present conducted, the difference in the taste of the Dutch and British salt is obvious in the curing of butter, and no substance will retain a taint in its manufacture so strongly as butter. The Dutch butter retains its butyraceous flavour after being salted, and although it will keep untainted as long as desired, it has the taste of what fresh butter would have on being eaten with salt; whereas the British salt butter of commerce tastes as if it had been pickled in bitter brine. There is as much difference between these two states of butter as between fresh beef eaten with salt and salted beef. There is no art in preserving butter from a putrefactive taint by immersion in brine, as herrings are usually preserved; but there is a difficulty, it seems, to salt butter in this country, so as to retain its delicate flavour like the butter of Holland, at least it has never been attempted by the butter curers. Now this difficulty cannot arise from the quality of the butter; for as delicate and rich butter can be and is made in Britain as in Holland: the difference of taste, then, in the two kinds of butter, must be ascribed to a difference in the quality and use of the salt. But why need there be a difference in the salt, when the Dutch make salt from the water of the same ocean? This is the question. There is no doubt that the bitter taste of our salt arises from a salt of magnesia which is probably not driven off by the quick evaporation used in producing common salt, for we have seen that the Sunday salt has no bitter taste, and it must therefore have no salt of magnesia. Slow evaporation would thus get quit of the evil. It would get quit of it both from sea-water and rock-salt. Salt being so bulky and so low-priced an article, a large quantity must be disposed of it to repay the labour attendant on its manufacture. I suspect the above difficulty of obtaining pure salt lies in this consideration. No analyses, then, of the Dutch salt, however ingenious, can discover any other thing than the absence of the salt of magnesia, and we know already by our sense of taste that salt does not exist in it. Till, therefore, a method is discovered of extracting or neutralising the salt of magnesia during the process of quick evaporation, for time will not be allowed for a slow one, we must be content to use an inferior article to the Dutch.

Dutch salt consists of three varieties, a very large crystalled, a smaller crystalled, and a fine crystalled. The whole is purely saline, and free from bitterness; so all the three may be used for preserving butter and beef with impunity. But the finest is used for preserving butter, being mixed intimately with the mass. The larger is used for curing meat, and it is admirably suited for that purpose. The large crystals melting slowly in the tub, the pickle is supplied slowly to the beef, which absorbs no more of it than is requisite for its preservation; and the beef is thus preserved tender; whereas the forcible introduction of salt into beef, in the shape of brine, hardens the fibre of the meat, and renders it dry by the displacement of the natural juice, and the bitter principle of the salt injures the flavour of the meat. The pure saline solution, gradually supplied by the large crystals, preserves the meat from putrefaction, but without injuring its texture or neutralizing its flavour. It would therefore be of national importance to take time and render our salt as innoxious as that of Holland, particularly for the preservation of that delicate article—butter.

### VI. To the Angus Breed.

This is a polled breed of cattle, and are technically called "Angus doddies." They are like the Buchan doddies on the one hand, and the polled Galloways on the other. They form an intermediate breed as to external characters. This breed has been much improved to what it once was, most probably through the intervention of a cross with the Galloway. Thirty years ago Lord Kinnaird, the grandfather of the present nobleman of that name, brought bulls from Galloway to cross with Angus cows to his farm of Idvies, now the property of Mr Henry Baxter, advocate, in the central district of the county; others followed the same course, so much so that it is questionable whether a dodded Angus beast can now be found without a dash of the Galloway blood. The characters of the generality of Angus cattle are these:—back depressed a little over the loins, the rump and tail-head a little too high, and the top of the shoulder a little below the level line; the buttocks too thin, and the brisket not forward enough. Looked from behind and before, the body is not broad enough, the hook-bones being too narrow, the ribs flattish next the back, and the hind and fore legs too close together. Viewed from above, the breadth across the shoulder narrower than across the hooks, the body being a little wedge-shaped. The legs are of moderate length and well boned; the muzzle a little coarse; the eye good; the ears a little too thick and hairy; of course the head is hornless, but tufted with hair, and the whole pretty well shaped, though not pleasantly set on the neck, which is rather too small at the onset of the head. The hair is short and smooth, the hide thickish, and the touch, though not harsh, not sweet. General colours, black, black with a few dead white spots on the belly and face, dark red of a dull and rich hue, and yellow red. These characters indicate a quiet disposition, and rather slow feeding. The common breed is capable of great improvement. Such of them as are in the possession of Mr Hugh Watson of Keillor, the Messrs Mustard, Mr Bowie of Mains of Kelly, shew how blood,—a refinement in the tone of breeding,—can be attained in any breed by judicious care in crossing with the same kind. But even yet the breeders of Angus cattle cannot with certainty depend on like producing like, the true criterion of a finished breed.

Mr Watson has bestowed for a long time much trouble and care in selecting a beautiful stock of cows and bulls. In consequence he has shortened the legs, beautified the symmetry, rendered the coat finer, and the touch sweeter, and improved the points of laying the beef on the best parts. He has shewn some fine specimens with these improved characters, particularly a pair of four and half year old oxen at the Highland Society show at Perth in 1829; and a heifer of the same age, a most extraordinary animal for quality and substance, and weight in proportion to her height. Her brisket was only eight inches from the ground. I understand that she was sold for L. 50 in London, whither she had been sent at the request of the Highland Society. Her four quarters weighed 74 stones, and the tallow was equal to the weight of a quarter. Mr Watson also shewed a pair of oxen, of the same age, at the Highland Society show at Kelso in 1832. These were considered by judges superior to the pair shown at Perth, and perhaps they were the best oxen of the breed that ever appeared. They were afterwards slaughtered in Edinburgh, and turned out 105 stones the four quarters. There is a remarkable appearance, though not a very pleasing one, which a very fat Angus beast exhibits, the smooth glossy skin appearing as if it were quite stuffed out to the full stretch.

Were the breeders in Angus to bestow half the attention which Mr Watson and a few others bestow, the breed would soon display a different appearance in point of quality. It ought to be a pleasure to any breeder to possess animals of the finest quality. But too many are afraid to lay out a few pounds on a good bull, and would rather employ any one that can only get a cow with calf, and buy every sort of calf that is polled that comes in their way. Nay, they will even buy a horned calf, if cheap enough, and make it polled by a cruel operation of extracting the embryo of the horn. This random mode of breeding makes very unequal lots of cattle when brought into the market. They are so unlike one another in appearance and value that the purchaser invariably points out the worst animals in the lot, by which to depreciate the value of the rest. In some respects these breeders are like the Irish farmers who will not winnow, but will obstinately persevere in selling the light corn and chaff along with the better grain. They of course always receive a low price. In like manner, these breeders will not assort their lots to suit the taste of different customers; they will not break their lots, as they call it, for the purchaser must take the whole overhead, rubbish and all, or want them. And, as to the breeding of bulls, no selection is generally made, the calf of a cow which is a great milker, if it happen to be a bull calf, is sure to be kept for a bull, regardless of the bull that got him, though he should not have one single good point on him. Now, no mistakes can be greater than these, and no injury is so hurtful to the breeder as that arising from the use of an inferior bull. A good bull may get a good calf by a very inferior cow; but an inferior bull can never get a good calf by any cow. This holds good in every breed of cattle, and more strikingly in an inferior breed. I once saw a short-horned cow which had, by chance, been bulled by a very ugly North Highland bull; the calf (a quey) was black, though the cow was a beautiful roan, and it was fed till three years old. The same cow had a heifer calf the following year by a short-horn bull, which was fed for two years. Both were sold at the same time; the two year old fetched L.18, the three year old only L. 10, besides losing one year's keep. These remarks are not intended to apply only to the breeders of cattle in Angus, for I know other counties in which this careless system is pursued much more systematically than in Angus; but that being a fine country for breeding, both by soil and husbandry, it is not unreasonable to expect a better system to prevail there than in poorer districts.

There is an immense number of cattle fed annually in Angus, and there is no breeding district which contains such a vast flying stock, many of the cattle bred in the north being fed off in this county. In the spring months more than one-half of the Glasgow market is supplied from this county, to the amount of 300 head a-week. Some of the feeders fatten from 50 to 200 head of cattle in winter. The principal feeders are Mr Watson of Keillor, Mr Dalgairns of Ingliston, Mr Kirkaldy of Fullerton, Mr Mill of Woodhill, Mr Inches of Cardean, Mr Farquharson of Baldovie, Messrs Procter of Glammis. The age of feeding off is generally four years, and some of the best, which are sent to Glasgow, weigh 60 stones or 70 stones. Many of the feeders in Angus do not breed at all, and they either purchase for themselves, or from dealers who select lots among the cattle in Aberdeenshire. Mr Peter Watson at Kirriemuir frequently dealt in this manner, and I have known him get L. 20 a-piece for Aberdeenshire cattle to be fed off in Strathmore.

The Angus cattle have extended over the whole county of Kincardine, and a large portion of the south of Aberdeenshire, to the exclusion of the large-horned breed, for similar reasons to those already given for the partiality of the Buchan breed. They have also found their way in many parts of Fifeshire. Large droves are annually sold to English dealers in the great markets in the county, at the Falkirk trysts, and at All-Hallow Fair at Edinburgh, who graze them and send them onwards, as they attain condition, to the English fat markets, and ultimately to Smithfield. They almost always pass in England under the denomination of Galloways, or, if fed in Norfolk, they are called Norfolk Scots.

## RETROSPECT OF THE CORN TRADE, BRITISH AND FOREIGN, DURING THE YEAR 1835.

By Mr William Gray Fearnside, Mark Lane, London.

In the course of the current year, the Corn Trade in Great Britain has experienced little excitement to divest it of the dulness and languor which have exerted their influence in depressing the markets for the four last seasons. Wheat, on the improvement or decline in the price of which so much depends the general character of the trade, has, with the exception of a few trifling fluctuations at the close of June and beginning of July, constantly evinced a tendency to recede in value; and the condition consequently of the farmer in England, Scotland, and Ireland, has been rendered still more depressed than at the termination of the year 1834, as the value of this staple commodity of life averaged then 41s. 5d. per quarter, the lowest range of the six weeks' averages ending the 28th of December being 40s. 6d., while the aggregate of the kingdom is now only a fraction above 37s., and the lowest range of the weekly general average 36s.; exhibiting a depreciation, which, taking the *maximum* and *minimum* rates of the county markets, may be calculated as creating at least a difference against the grower of from 5s. to 6s. per quarter; and though the consumption of wheat has been unprecedentedly large, in consequence of the progressive improvement in the demand for labour in the manufacturing districts, enabling the artisans to become more extensive purchasers of bread at its reduced price, and owing likewise to the disproportionate value of the article compared with other species of grain, having induced its application to purposes seldom resorted to, as malting, distilling, and feeding of animals; notwithstanding which, the stocks in the hands of the farmers have proved more than commensurate to the demand, and even now may be reckoned as considerable. It may not be devoid of interest at this part of the report, briefly to refer to the principal causes which have been operating on the trade, so as to reduce the currencies to the ruinous rates complained of by the agriculturists. Various opinions have arisen respecting the cause of this depression, which, as it proceeded from the abundant growth, was at variance with the previously formed statistical calculations, founded on the supposition that England, under any circumstances, would not grow sufficient corn to meet the annual demand, and that even an average crop was about nine per cent. less than the consumption required, the detail of which we have in a former number more particularly entered into, thus determining we were always dependent on foreign countries to supply us with "the staff of existence." These calculations and reasonings are now proved to have been erroneous, as the imports of foreign wheat have been very trifling, and almost entirely derived from our own colonies; and yet we have now reaped the harvest of 1835 with a large surplus of old wheat remaining still on hand. The principal, if not the sole cause, which has produced the effect so deeply felt by the agriculturists, may be traced back as emanating from the large foreign imports of 1829, 1830, and 1831, succeeded by a series of abundant harvests. The quantity of foreign wheat entered for the home consumption, was, in 1829, 1,363,367 quarters; in 1830, 1,701,885 quarters; and in 1831, 1,486,177 quarters, making a total of 4,551,429 quarters. Reference, however, must be more particularly made to the last year's imports, as the surplus imports of 1831 created as it were the *nucleus* of the subsequent extensive stocks. The duties at this period were at the minimum range of 1s. per quarter during the four weeks of March, the aggregate of the six weeks' average having advanced to 73s. 5d.; after which, the averages at first gradually, and then rapidly, declined. Danzig wheat, which was noted at 84s. per quarter in February, receded in the beginning of May to 72s. Much, therefore, of the wheat which had paid duty was kept off the market, as the currencies continuing to decline, speculators hoped the quotations might rally, having in most instances bought at exorbitant rates, foreign prices having ranged as follows:—Danzig high mixed wheat, 63s. to 66s.; Silesian, 62s. to 64s.; Bohemian, 60s. to 62s.; Stettin the same; Mecklenburg, 56s. to 59s.; Holstein and Denmark, 51s. to 56s.; Brunswick, 62s. to 63s.; Anhalt, Marks, Madgeburg, and Saale, 63s. to 65s.; St Petersburg, 41s. 4d. Riga, Courland, &c. 46s. 6d. The value of wheat in England remaining depressed, and harvest approaching, created a twofold incentive to holders to retain their foreign stock, and caused at this early period a pressure to a certain degree to hang over the trade; the new produce proving rather more than adequate to the demand, and the additional quantity of foreign wheat serving to increase the stocks at the commencement of the harvest of the succeeding years, which were again enlarged in 1833 and 1834, from similar causes, have, by annually augmenting the stocks, effectually checked all improvement in price, and kept the markets constantly well supplied.

Under these circumstances, wheat, which, owing to deficient harvests, and other collateral circumstances, had been driven up to an artificial value by the protective character of the laws preventing the admission of foreign corn, unless the article had attained a starvation price, has now gradually regained its level, and become more commensurate with other articles of food and clothing benefiting the community at large, to the severe loss and privation of the growers; but affording them at the same time ample proof, that one of the main evils of the present code of laws detrimental to their own particular interests, is that of diverting speculation from *British* to *Foreign* corn; and having the effect, under one set of circumstances, of excluding all foreign supplies, and under another, of introducing it in great quantities, with the consequent tendency of encouraging speculation, and giving to that species of venture a vacillating and gambling character. Another circumstance has contributed to depress the quotations; farmers as well as speculators have endeavoured to hold their wheats, in consequence of every other description of agricultural produce having of late years borne a higher relative value, and thus the farmer has been induced to attempt to reserve his wheat in preference to other corn, anticipating a more favourable conjuncture for its disposal; though this motive is not likely to influence the agriculturist this season, as the plentiful return both of barley and oats will, in all probability, reduce the currency to a par with, if not below, the proportionate value of wheat. Indeed, the experience of all nations and ages proves, that it is freedom, and freedom only, that can put an effectual stop to those sudden and excessive fluctuations in the price of corn, which are extremely injurious to all grades of society, but more decidedly so to the farmer. When a comparatively rich and highly populous country like England excludes foreign produce from her markets, she is compelled to resort to inferior soils for supplies of food; consequently her average prices are raised far above the common level of surrounding countries; and, therefore, we would wish the agriculturist to mark the inference, that when an unusually luxuriant crop does occur, no relief being obtained from exportation, the whole surplus produce is thrown on her own markets, and a ruinous depression of price necessarily and unavoidably follows, as by preventing importation, except in years when the home crops are deficient, we of course check the establishment of any regular and systematic intercourse with foreign countries. On this subject, however, the agriculturists seem themselves becoming aware, and have forsaken the "beaten path" of the *Corn Laws* and *Protective Duties* at the late Agricultural meetings, and have adopted the more abstruse topic of "the currency." The assertion of Lord Stanley, when he states, "I am bound to say that those are the truest and sincerest friends of the agricultural interest, who warn them against entertaining any exaggerated or overstrained expectations of the relief which it is in the power of Parliament to extend to them. I repeat, therefore, that we must look for the relief of the agricultural interest less to any thing that can be done in Parliament, than to a proper understanding between landlord and tenant, to increased skill and knowledge, and to an increased desire on the part of both to make the most of the abundant materials placed in their hands, towards forwarding the national prosperity." These excellent admonitions, supported by the repeated addresses of the Earl Fitzwilliam and other intellectual men connected with agriculture, seems tardily to be bringing conviction home to the farmer, and awakening him to the true character of his position and interests in the country.*

The fact, therefore, is, that the rates of wheat have been reduced by degrees to as low a range as in the years 1779–80, and the pressure on the agricultural interest is now being more severely felt, than at the time when it was acknowledged by the "Agricultural Committee of the House of Commons," to prevail to a considerable extent. The farmer, in too many instances, is incapable of retaining his produce, in order to avail himself of any casual improvement in the markets, but is necessitated at all hazards to send his corn for sale as soon as thrashed, and, as we have before alluded, contributing himself, by these means, further to depress the trade. The prices he is at present obtaining, oblige him to make a ruinous sacrifice in the disposal of his wheat, as it requires *two-fifths* more in quantity to be sold, in order to raise the amount equivalent to the rental of many farms, whose value has been estimated at a rate, say 60s. Sterling, and which was then considered as only a remunerating price. Subsequent to the year 1815, a season has rarely been experienced, in which the grower would, in this country, realize much more than was necessary to meet the charge of rent, tithes, poor laws, and current expenses, and many have considered themselves fortunate, if they have not encroached on their capitals. Since the war, the rents of farms generally have been scarcely reduced one-third, and in most instances no abatement has been conceded, until the capital of the tenant was exhausted, and a debt incurred in raising the annual amount which was stipulated when grain was selling on high terms. Indeed, rents have of late been drawn either from the capital of the tenant, or from the forced cultivation of the soil, and these resources cannot, it is impossible, be much longer resorted to. Capital has been destroyed, and the land impoverished, under the vain attempt to pay an exorbitant rent, and landowners are suffering, and likely to suffer more from deterioration of the soil, than they are, we are inclined to think, generally aware of. Landlords are, however, again assuming the appearance of generosity, in reducing nominally their demands 20 to 25, and in a few instances even 30 per cent.; but the reduction should be 33 to 40 per cent., which would only afford a fair proportion to the reduction in the price of wheat; but it is to be lamented, that few, very few, have been actuated with the view of making the diminution in the amount permanent; thus keeping the high *pressure system* still in force on the industry and profits of the growers, and only removing the weight from the tenants' shoulders until, by a fluctuation in the prices of his produce, he is again capable of sustaining the burden. It is, in truth, beneath the subterfuge of liberality, saying, As we find it impracticable for you to raise the amount of rent, we will assume the credit of not enforcing the payment in full, or, as it is termed, of returning so much rent; but the moment any chance should occur to enable you to pay us more, we will reserve the power of securing it. No solid benefit, however, can accrue from such measures of temporary relief to the agriculturist, unless, as a preliminary step, rents are permanently reduced more in accordance with the existing currency of wheat. A few landowners are becoming sensible of the impolicy of the system of high rents, and some farms in England have been re-surveyed, with the view of granting fresh leases, more on an equality with the present value of agricultural produce; as it requires a mere modicum of reflection to convince landlords, if, indeed, this important subject is reflected on, that they are bound to relieve the occupiers of farms from onerous responsibilities, which the prices of grain render them incapable of supporting. We cannot dismiss, however, this important subject, without referring to the admirable and pointed observations of Earl Fitzwilliam, when Lord Milton, in animadverting on this point, and which cannot be too often adduced, in the hopes that, by their repetition, they may become indelibly imprinted on the minds of all landed proprietors, to which class of individuals his Lordship's admonitions are more especially addressed: "You ought not to have been driven to the wretched expedient of returning a per-centage to your tenants at each successive audit, in order to induce them to remain on their farms, —an expedient which proclaims to your fellow citizens, that those who resort to it are in the habit of demanding from their tenants a larger rent than they are capable of paying. Nothing, I must confess, is more distressing to me, than to witness these half-yearly annunciations of this miscalled liberality, of certain portions of the landed interest. Has it never struck you, fellow-citizens, that this proceeding is no evidence of liberality, but rather of extortion; that the return of part of the rent may be proper, when called for by temporary calamity,—by the effects of flood, or storm, or by some accidental misfortune overwhelming a particular tenant, or class of tenants; but that when resorted to habitually, it is not to be justified; it convicts those who have recourse to it of continued attempts to extract from their tenantry a rent not warranted by the value of agricultural produce; and that, so far from proving the liberality of the landlord, it affords testimony of a very different quality." From this diversion, which the interest of the topic, as connected with agriculture, has more particularly induced us to dilate upon, we will now revert to the subject-matter of our retrospect, offering only in extension the brief remark, that the high prices and rents for some years reaped by the growers and owners of land, ought not to have obliterated from their recollection the dictum—*opulentia mox paritura egestatem*.

---

* It will be full time, we think, to eulogise the sentiments expressed by Lords Stanley and Fitzwilliam on agricultural distress and the corn laws, after Parliament shall have effected all that it can effect in the equalization of the burdens of taxation over every interest in the country, but which it has never yet attempted to do. Till that is effected we cannot acquiesce in this part of our correspondent's paper.—EDITOR.

The weather throughout England, during the early part of the year, had been extremely favourable for all agricultural operations, and the absence of wet favoured the sowing of spring corn. As, however, the month of April advanced, the night frosts proved severe, which, while they were advantageous in checking the luxuriance, amounting to rankness, exhibited in the growth of the young wheat-plant from the mildness of the winter, yet, at the same time, were prejudicial to the newly sown seed, in retarding its vegetation. In the first portion of the month of May, the weather continued cold and ungenial, accompanied with wet; but towards the close a seasonable change took place, and during June the unfavourable impressions entertained regarding the growth of the crops were dispelled. On the 23d of June, we experienced one of those sudden transitions in the weather, to which our climate is so remarkably liable; and instead of enjoying a continuance of sunny and serene atmosphere, we were surprised with a gale of wind and heavy fall of rain for three successive days, which had the effect of lodging a large proportion of the wheat and barley (the oats not being sufficiently advanced to receive any material injury), and giving rise to anxious apprehensions for the ultimate fate of the crops. The weather fortunately again improved, and the grain, assisted by the attractive power and influence of light and heat, assisted likewise by the mechanical power of a fresh and brisk current of air, was soon either restored to its erect position, or materially relieved from its recumbent posture. The sun having resumed its full ascendancy, forced rapidly towards maturity all species of corn and pulse, though during July the temperature of the air was subjected to considerable variation; in the day-time the thermometer ranging from 63° to 84°, and at night receding as low as 55° and 50°, being 5° to 10° below the point favourable to the progress of vegetation. About the 19th of this month, reaping in the forward districts began, and by the first week in August had become general. On the 3d of the month, the first samples of new wheat in bulk were exhibited at Mark Lane, being one week later than the harvest of 1834, the first parcels being then shewn on the 28th of July. The weather remained unusually auspicious during August, and the first week of the succeeding month, by which time the crops of wheat, and much of the barley in the southern, eastern, and western portions of the country, were secured in most excellent condition; but in the north, as well as in Scotland, Wales, the Isle of Man, and Ireland, the harvest having commenced a fortnight later, was much retarded by the rains which set in in the second week in September, and were prevalent during the remainder of the month, and also October. The consequence has been, that most of the grain in these divisions of the kingdom has been housed in damp and moist condition, and will require the cold drying of winter to render it available for the miller.

The appearance of the standing crops of wheat, from the abundance of the straw, led to the conclusion that the return would be plentiful, exceeding in amount the produce of the previous harvest. On inspection, however, these flattering appearances were found deceptive, many ears turning out blighted and chaffy, with a partial or total failure of grain in many; and when thrashing had commenced, and the only criterion on which a certain calculation could be grounded had been essayed—that of ascertaining the yield per acre,—it was proved, in too many instances, that the produce was more deficient than the sanguine hopes of the farmer had anticipated. Where four, five, and six quarters, and even a larger quantity per acre, had been calculated upon, only two and a half to three and a half or four quarters had been measured out. It is true there is a decided reduction in the breadth of land sown with wheat this season throughout Britain, and particularly so in the north of Ireland, where it is reckoned upwards of 50,000 acres formerly occupied with wheat have been appropriated to the cultivation of flax; and though by some elaborate estimates have been formed, shewing that the produce will be nearly *two millions* of quarters below a full average, still there are others who, perhaps with more judgment, reckon that, making every due allowance for the falling off in the yield, as compared with the two previous seasons; yet, from the superabundance of straw, and consequent increase of ears, firmly maintain the opinion, that the general result of the crop of wheat of 1835 is not far short of a fair average growth.

Though on several farms in England the quality of the wheat is extremely fine, and equal to the produce of any previous year, yet the samples, generally speaking, are uneven and irregular, exhibiting many thin and shrivelled grains, materially affecting the weight and yield, which may be rationally accounted for by the three days' heavy rain and wind experienced towards the close of June, accompanied with cold chilly weather at that critical period of the blooming of the plant, when it is most sensibly alive to injury from atmospherical affections. The showers and humidity which are usually characteristic of July having totally failed, caused the ear prematurely to advance, without permitting time for the juices progressively to swell the kernel, and give it that plumpness consequent on a slower ripening. Smut also prevails to some extent. The difference in the prices of Essex, Kentish, and Suffolk wheats, may be stated as follows: —In November 1834, white wheat was noted in Mark Lane at from 42s. to 56s. per quarter; red ditto, 41s. to 47s. In the present year, the former article is worth 36s. to 45s., and the latter, 34s. to 39s., shewing a decrease of 6s. to 11s. in white, and 7s. to 8s. in red descriptions; and, as exemplifying the disparity in the quality, samples appeared in August of Lincolnshire and Cambridgeshire wheat, weighing only 53 lb., and not worth more than 28s. to 30s., and others again as heavy as 63 lb. The weights generally may be taken from 54 lb to 65 lb., and a few samples as heavy as 66 lb. and 67 lb.

The speculator in foreign wheat has been afforded few opportunities of finding any vent for his stock during the past year. In May, the opening of two of the principal Spanish ports for the admission of foreign wheat, caused some degree of excitement in the holders of bonded corn, not only in England, but in different parts of the Continent; and shipments were made from the Mediterranean, Bay of Biscay, the Baltic, Elbe, and Thames. The deficiency of corn was stated as extensive in Catalonia and Arragon; but as a considerable quantity had been smuggled into these provinces, the amount officially noticed as being required was only trifling, and even before it was completed the port of Malaga was closed. The speculation, therefore, on the part of the shippers, turned out far from profitable. On this occasion, inferior wheat obtained 26s. to 28s., and fine, Kubanka, 30s. to 32s., since which occasional sales have been made of other qualities, at from 18s. to 25s. In August, however, another ray of hope seemed glimmering in order to relieve the dreary prospect which had so long been presented to the view of the speculator. The Chamber of Commerce at Plymouth, supported by the merchants and corn-factors in London, presented a petition to the House of Commons, begging permission to grind the bonded wheat into flour for export, principally to America, where flour had been materially enhanced in value, in consequence of the unfavourable reports of the wheat crop, which had suffered from the severity of the winter. Ministers, though they acquiesced so far in the prayer of the memorialists, by acknowledging they were entitled in justice to relief, were yet prevented from carrying into effect any legislative enactment, in order to release the capital of speculators, amounting, at the very minimum calculation, to *twelve hundred thousand pounds*, in consideration of the advanced period of the session, and "the jealousy and suspicion with which the landed interest looked upon insulated enactments of this nature:" thus losing sight of the fact, that, in the year 1825, when the restrictions on the import of foreign flour and biscuit into the colonies were removed, no provision was made for enabling the British miller and biscuit-baker to enter into competition with the foreign manufacturer, for supplying our own settlements with these necessary articles, by which means this branch of business has been thrown into alien hands, to the decided detriment of the mother country.* Facilities also of an exclusive character, for the conversion of foreign wheat into flour, have been granted to Guernsey, Jersey, and Isle of Man, as well as to the Canadas, proving an additional source of injury to the home miller; and no doubt exists, that by grinding foreign wheat, as an article specifically set apart for export, much benefit would be derived by the trade, without disadvantage, directly or indirectly, to any other interests. There is now a considerable quantity of bonded wheat, for which there is no sale at hardly any price; yet the holders have the mortification of weekly witnessing small shipments of bonded flour going out to the West Indies and South America, and made use of also in order to feed the ship's company on the voyage; so that the sailors, as soon as they are below Gravesend, can consume the article at half the price they can that of the British manufacture; not that the cheapness is liable to objection, but that *we*, instead of realizing the profit consequent on supplying them, wantonly deprive *ourselves* of the advantage reaped by the Danzig, American, and other foreign millers. The adoption of the measure would therefore create a branch of trade to the British miller and biscuit-maker, by which a large capital, together with much additional labour, would find employment, at the same time proving extremely beneficial to the merchants, by liberating a quantity of corn which is rapidly deteriorating in quality in the granaries, or being destroyed by the weevil, which, in some instances, will soon leave little *farina* for the owner to have manufactured into flour, as well as being a source of advantage to the agriculturist, by setting free a large sum of money now locked up in corn, a great portion of which would be laid out in British grain.

---

* See miscellaneous notice on this subject, No. IV. intituled "Foreign Corn and Flour Trade," in this Number, p. 480.—Editor.

The crop of barley on light gravelly soils has turned out thin and inferior, but on mixed, heavy, and retentive soils, extremely abundant, proving on the whole more than an average produce throughout England. Much of the grain was secured in excellent condition, but, from the want of rain, many of the samples are thin, irregular, and *steely;* that which was outstanding when the rain set in, has, in many instances, been mellowed and rendered more *kindly*, though several samples have in consequence become high coloured, and if overripe, blackened; yet this outward deterioration has not much interfered with its malting qualities, as the new malt proves extremely tender. The colour particularly of the Chevalier is remarkably bright, and resembles the famous silver barley of 1818; the weight is heavy, ranging from 53 lb. to 56 lb., and some few samples even exceed 59 lb.; parcels, however, are found not exceeding 50 lb. to 51 lb. The cultivation of chevalier barley has now been successfully carried on for some years in England, but the grain is already exhibiting symptoms of degeneration, and though the sample to the eye is still beautiful, yet its extract, that is the saccharine matter it affords, is comparatively not so profitable to the brewer, as that which is obtained from fine qualities of common Norfolk and Suffolk growth. The prices of the article as compared with this period last year, exhibit a difference of about 7s. per quarter decrease in the value of malting qualities, 4s. in distilling descriptions, and 3s. to 6s. in grinding sorts;—the quotations in 1834 having been, chevalier barley, 40s. to 43s.; common malting 34s. to 39s.; distilling 31s. to 34s.; grinding 28s. to 32s.; and in 1835 the currencies are, for the first description 33s. to 36s.; for the second 30s. to 32s.; for the third 27s. to 30s.; and for grinding 25s. to 26s. per quarter. In the beginning of the year, the gradual advance in the averages, and the high price the better qualities of barley were realizing, equivalent even with the rates of the best wheats, encouraged speculators to make extensive purchases of Danish and Holstein barley, as the samples, particularly in the Duchy of Holstein, were unusually fine; and for which, from 13s. to 17s. per quarter were paid; the bulk having been bought at from 15s. to 17s. As, however, the partial substitution of wheat-malt, with large stocks of old malt, added to the advanced state of the season, having prevented the demand from being as extensive as was at first anticipated, the aggregate averages did not advance higher than 32s. and a fraction. The importers, therefore, were compelled to pay a duty of 13s. 10d. per quarter; a few of the early arrivals obtained 35s. to 36s.; but the greatest proportion, 31s. to 32s., and prime 33s. and some 29s. to 30s. About 132,000 quarters paid a duty of 13s. 10d., of which 55,000 quarters were entered at the port of London. Since which the duties have continued prohibitory, and the business in bonded barley has been confined to occasional sales at 13s. to 15s. for export, chiefly Norway, where the crop this year has partly failed.

Oats, considering the diminished breadth of land now cultivated with this species of grain throughout this country, have been productive, and quality remarkably fine, though several parcels are stained, from their exposure in the fields during the rainy weather. The weight averages from 38 lb. to 42 lb. As to prices, they have undergone fluctuations. At this period last year, English qualities were worth 23s. to 26s. 6d.; Scotch 24s. to 29s.; Irish 19s. 6d. to 24s. 6d. Scotch in the early part of the year receded 2s. per quarter, and Irish 1s. 6d., but towards May and June the currencies regained their previous rates, and various calculations were made as to the probable amount of foreign corn that would be required to meet the demand until the new crop was brought to market. These elaborate estimates, however, were more remarkable for their ingenuity than their correctness, corroborating our opinion, that the only decided inferences to be deduced in the corn trade are from existing circumstances, and that no conclusions can be made from analogy, or any antecedent fact, however plausible it may appear to be, to argue, that, as former circumstances have led to previous results, there remains the same probability of a recurrence. The observations which were made, and deductions drawn, as to the prospects of the oat trade, were numerically substantiated by previous occurrences; yet an omission took place in the calculations, in not making an allowance for the circumstances, that the low price of wheat throughout England, Scotland, and Ireland, in comparison, weight for weight with that ot oats, had forced an unusually increased demand for the former article, which had been largely substituted in lieu of oats. In this country the mixture of inferior wheat in the food for horses has been most successfully adopted, and which consumers are now profitably availing themselves of. In one instance, we know that a party who is extensively concerned as a proprietor of horses, and who feeds his cattle by weight instead of measure, (a practice, with the addition of steeping, at present much resorted to with beneficial results both to the animal and owner), has, by the substitution of wheat, inferior barley, &c. effected a saving in his outlay of as much as from L. 18 to L. 20 per week, which, though it at first appears a large sum, is easily accounted for, when it is stated that the saving of food is 3d. in every 14 lb., and the weekly consumption rather exceeding 60 quarters, the total is thus derived. The increased amount likewise of oats returned as sold in Mark Lane, from which the London averages are made by the inspector, and from whence the consumption is estimated, does not at any time, but more particularly during an excited period of the market, afford any just criterion of the fact, as many and the same parcels are purchased on speculation by different parties, and returned as sold to the inspector over and over again, which places it in the power of interested individuals to *work* the averages, as it is termed, and by purchasing different parcels at high prices, sell them backwards and forwards to each other, and thus raise the averages in order to depress the duties, and admit the grain they have lying in bond at lower rates. This connivance was attempted this year with oats, but failed, owing to the *clique* being formed too late, and the continued supplies from Ireland and Scotland. In pease, however, it was more fortunate. At the end of July, the average of pease, which was at 37s., with a duty of 14s., advanced in one week to 39s., the duty declining to 11s. in consequence of a return from Warwickshire of 300 quarters sold, *nominally*, it *is presumed*, at 50s. 7d., which made the aggregate weekly average more than 45s. After the lapse of a fortnight, the Inspector General *struck off* the average, but, in the mean time, the object had been attained, and the duty paid on the pease in bond.

Extensive purchases of oats were made in Holstein, Denmark, Sweden, and Friesland, commencing at 10s. and 11s. and closing at 14s. The prices in England, though they remained steady, evinced no disposition generally to advance, though old Scotch heavy oats from their scarcity realized 1s. to 2s. more money. Dealers and consumers, aware of the quantity of bonded oats ready to be entered for the consumption on the duties attaining their minimum range, held off from purchasing, and supplies not decreasing to the extent anticipated, the quotations began to shew symptoms of declension; and as the new oats had in some instances been secured in such excellent condition that they were fit for immediate consumption, the duties did not recede lower than 10s. 9d. If the bulk of the quantity rendered free being in the early part of September, the currencies then ranging at 18s. to 19s. for stale foreign feed, 20s. to 22s. for fresh heavy, and 23s. for fine; Russian qualities being worth 19s. to 21s. per quarter. The total amount of foreign oats brought on the principal markets has been in London 125,000 quarters, in Liverpool 4300 quarters, Bristol 2600 quarters, and in Hull 17,600 quarters; and altogether throughout the kingdom 175,000 quarters. Since which, prices have farther given way; and English are now worth 16s. to 23s.; Irish 16s. to 22s.; Scotch 19s. to 26s., fine old potato 27s.; making a diminution in the value during the twelve months of 3s. 6d. to 6s. in English qualities, 2s. to 4s. 6d. in Irish, and 2s. to 5s. in Scotch

Beans can be barely estimated as an average crop, but pease have yielded well, both species of pulse being fine in quality and in superior condition.

In Scotland the harvest has been much retarded, and the crops deteriorated, by the unfavourable character of the weather. The grain which had been nearly matured previous to August, was about to be secured, when in the middle of the month rain set in, and materially affected the condition and quality of the grain. Fortunately the temperature was low, which prevented sprouting to any serious extent, though the greatest apprehensions were experienced for the result; but where activity and judgment have been displayed, it is astonishing to find so little actual injury has been sustained.

The cold ungenial weather in the spring checked the growth of the wheat plant, which in many districts, particularly those in a more northerly direction, did not fill well in the ear, besides being thin on the ground; and when the grain became ripe, the rain affected the condition, yielding a rough, damp, discoloured, and irregular sample, in many instances infected with smut and varying in weight from 54 lb. to 63 lb. In a few parts where the corn was housed prior to the rainy weather, the sample is bright and good. The growth of wheat, taken generally, is below an average, though perhaps equal in bulk to the crop of last season. Old wheat, of which there are still stocks in the farmer's hands, is therefore in request, in order to admix with the new; and maintaining a higher relative range of price. Purchases also of sound dry corn are being effected on the English coast for shipment to the north, as the winter must be advanced before the greatest portion of the new wheat can be made available to the miller.

Barley may be reckoned a full average crop, and even abundant in the more southern parts of the country, where in some instances it was secured under favourable circumstances; but the bulk of the produce, particularly in the northern portions, has suffered from the inclemency of the weather, much being sprouted and stained from being left out standing to an unusually late period. The chevalier, of which a considerable breadth has been sown, has suffered the least, and much is found which makes good and tender malt. Weights of common runs vary from 50 lb. to 56½ lb., Chevalier from 54 lb. to 58½ lb. per bushel. The brewers, who became alarmed by the rains, and deemed the native produce would be only fit for distilling and grinding, bought rather freely in Norfolk and Suffolk. But new samples of barley having been malted and tried by the brewers, they express themselves well satisfied with the malting powers of the article, and with the quantity of extract which has been produced. The impression therefore is, that the trade will be much less dependent on England than was at first conjectured.

The growth of oats has disappointed the expectations of the farmers. In June and July the promise on the ground was highly flattering, but the excessive drought of these months caused a premature ripening, and a consequent want of fulness in the ear, and before the crop was harvested most of it was more or less damaged by the rain. The sample is in consequence stained and dark in colour, and some much injured by sprouting. The quantity is below an average, though some of the corn is heavy and fine. Potato oats weigh from 41 lb. to 44 lb.; Angus 38 lb. to 42 lb., inferior 35 lb. to 37 lb.

Potatoes, which have so great an influence on the corn trade, and for the extent of which sufficient allowance in speculative calculation is seldom made, are below an average produce estimated per acre; but from the increased quantity of land under cultivation with this valuable root, no dearth of the article is likely to be sustained.

The quantity of flax sown this season has been much increased, and as corn has declined so much in value, with little probability of its again attaining a high average range of price, the cultivation of the article may be advantageously encouraged both in Scotland and Ireland, the quality and texture being so superior, that it commands in the market nearly one-third more money per ton than most of that imported from abroad. Flax, it may be urged, affords to the soil no return in the shape of manure; but when artificial manures can be procured at a moderate rate, and be applied so beneficially in raising turnips, there is little probability of deteriorating the condition of the land by growing flax to a moderate extent, and under judicious treatment.

In Ireland the weather has been rainy and unsettled during a great part of the harvest, and in consequence the quality and condition of the grain is more or less affected. The complaints, however, to what we have before alluded respecting the paucity of information to be obtained from the sister kingdom, prevents the possibility of our yet furnishing any detailed authentic account of the harvest.

Wheat is generally considered below an average produce, both as regards quantity and quality, and the samples come to hand damp and irregular. The stock of old wheat is becoming much diminished, owing to the increased consumption of flour, to the exclusion of oatmeal, and which has equally prevailed in Scotland. Old wheat and fine dry new qualities are much in request, and bear a much higher range of value than the new produce, which is ruling extremely low, millers having got largely into stock at 15s. to 15s. 6d. per barrel; red qualities having been noted at from 15s. to 19s., white 17s. to 21s. per barrel.

The growth of barley is now much improved by the extensive introduction of chevalier seed. Many samples are stained and light, not exceeding 46 lb. to 48 lb., but the produce is a full average; the lighter qualities have been offering as low as 9s. to 11s. per barrel, the heavier distilling and grinding sorts at 11s. 6d. to 12s. 6d., and malting parcels at 13s. to 14s.

Oats have proved an abundant crop, though, from exposure to the rain, many samples are weathered, but the corn heavy, averaging from 36 lb. to 42 lb. per bushel, prices being noted at from 9s. to 10s. per barrel free on board.

The produce of potatoes has not been as good as was expected, and inferior to the quantity obtained last season.

The sowing of flax seed, which was extensive, has produced a very satisfactory crop, and flax continues in good demand; the low price of grain affords also an additional stimulus further to extend the cultivation of this useful article.

Sufficient time has not yet transpired to collect any general information as to the state of the crops throughout the widely extended territories of the *Russian Empire*. Rye, which is the principal article of consumption, is unfavourably reported as to its produce, and prices have, in consequence, been enhanced, the quotations at St Petersburg ranging as high as 27s. 4d. to 28s., and wheat at from 30s. 1d. to 31s. 9d. per qr. for best descriptions. The first supplies of grain and rye-meal had arrived from the interior, consisting only of 200,000 kuhl; the second was not expected to reach before the winter; and the third will not arrive until after the frost, the barks with the supplies having been detained by the lowness of the water. The monthly consumption of St Petersburg is estimated at 50,000 kuhl to 55,000 kuhl; the private granaries are cleared out, and in the neighbourhood of the city the cultivation of grain is limited, added to the crop having yielded badly. As far, therefore, as the season has advanced, the city is very scantily supplied with provision, and any renewed restriction on the entry of foreign grain not to be anticipated. Indeed, the scarcity may be severely felt before the supplies of new corn can be brought into consumption, as speculation, by the impolitic interference of the Government, has been completely paralyzed. The merchant who may have embarked his capital in grain, does not know when or at what price the Government will dispose of the stores in the national warehouses. They, not content with suddenly allowing an influx of the article to come upon the market, and realizing the currency of the day, also affix their own price much below the current value, and at rates ruinous to the private holder,—a proceeding, in a mercantile point of view, intolerable,—and, at the same time, unjust to the honest trader, who is totally incompetent to compete with the all-powerful influence of the Autocrat's Government. Linseed has continued to meet speculative attention, and extensive purchases have been made of Morschansky and similar qualities at from 41s. to 44s. per qr., and 45s. 6d. being demanded. At Riga some arrivals of new sowing linseed had been received, about one-sixth of which had been condemned by the seed *braak* or inspectors, appointed to ascertain the quality of the seed as it arrives, and who have been obliged to condemn much of the supply, as a good deal this year is unripe, and has suffered from frost. The rates last noted were 28s. 6d. to 29s. 4d. per barrel, crushing qualities 42s. 4d. to 43s.; wheat 23s. to 27s. 11d.

At Odessa the receipts of wheat from the interior have latterly been considerable; and, as the Italian ports are generally well supplied, the demand for export has nearly subsided. Wheat has materially declined in value, particularly soft qualities, which have been as low as 18s. 4d; hard wheat 22s. 4d.; and at Taganrog hard wheat is noted at 22s. 4d. to 23s. 7d. The last crop was much more abundant than that of the two previous years. Owing to the failures in 1832 and 1833, the export of grain, which almost formed the sole business of the city, has dwindled into comparative insignificance, and, indeed, has been exceeded by the imports. Thus commercial enterprise, which found no employment in the usual channels, has, in consequence, sought new openings, whence a variety of entirely new exports have arisen, and others have attained an increased extent. Disastrous as the failure of the crops were in the southern parts of Russia, yet this part of the country will derive a lasting benefit from these trying seasons, by the development of the new resources which they have called forth, and are likely to contribute, in no trifling degree, to the future prosperity of the city. A great increase in the cultivation of linseed has taken place in the southern provinces, and the fine quality of the seed proves the soil to be peculiarly adapted for this article.

In *Prussia*, *Pomerania*, and *Poland*, the weather has been favourable for the crops during the season, with the exception of some districts of Volhynia, and all descriptions of grain have been housed in good condition, the quantity proving fully an average produce, with the exception of barley, which has considerably failed both in quality and yield. The quality of new wheat is good, but not equal to the superior growth of 1834, the grain being sound, and even heavy in the Prussian provinces and adjacent parts of Poland; but in the higher provinces of Poland the weight is deficient, much being only fit for distillation; but of previous crops a considerable quantity of wheat, kept back by want of water in the rivers, still remains on hand, and should water carriage be practicable the ensuing spring, ample supplies of good quality will reach Dantzig down the rivers Vistula and Bug. This port, which is the principal mart for the finer wheats in the Baltic, has been only moderately supplied with corn, yet more than equivalent to the demand. Prices in consequence have continued to recede, and are now at a very low rate, fine high mixed qualities of 62 lb 25s. to 27s., and prices expected to become depressed as low as 24s.; especially as the Dutch Government have imposed heavier duties on the admission of foreign grain. The increased duty has become the source of much discontent to the merchants at Dantzig, as well as at all the lower Baltic ports; as Amsterdam and Rotterdam were the only remaining outlets for part of their surplus stocks, and the imposts now levied are almost equivalent to a prohibition. Without questioning the policy of this protective system, the principal point on which censure arises, is the precipitancy in adopting the regulation; no intimation having been given to the foreign exporter, nor time allowed in any way to retrieve his speculation, affording no alternative but that of either disposing of his grain at a loss, placing it in bond, or sacrificing the amount of the freight. The prices of grain having continued depressed for some seasons, the farmers have hardly been enabled to realise the profit required to meet their disbursements, and have begun to apply their attention towards the cultivation of rapeseed, which promises a good reward for their trouble.

In *Mecklenburg* the prevalence of fine weather during harvest has enabled the farmers to secure their crops in excellent condition. The growth has been large, and the produce would have yielded abundantly, had it not been for a hurricane which swept the whole line of the country with disastrous effects on the 8th and 9th of September, destroying, on a fair calculation, upwards of 80,000 quarters of grain, chiefly wheat; added to the unusual drought, which prevented much of the corn on light soils from arriving at full maturity, and producing a plump and even sample. Owing to these combined circumstances, wheat is only a moderate average crop, barley less than an average, oats one-third of an average, and about an average of rye and peas. Wheat is fine and bright in colour, but not equal to the sample of 1834, the corn dry and sound, and weighing 62 lb. to 64 lb.; barley bright, and kindly for malting, and of 51 lb. to 53½ lb.; oats good in colour, and weighing 36 lb. to 38 lb.; pease even, and free from worm, but rather small. Wheat may be purchased at 20s., barley 13s., oats 11s. 6d., and during the winter shipments are expected to be obtained on still lower terms. The stock of wheat is from 60,000 to 70,000 quarters. The potato crop is deficient.

In *Denmark* the quantity of winter corn has been considerably diminished by the heavy gales of wind which prevailed at the time when the corn had arrived at maturity, and which caused the heaviest grain to be shed, and a loss sustained, which is calculated at one-fifth of the whole crop throughout Jutland and the Danish Isles. Wheat, with few exceptions, is small and light, the colour by no means fine, and the weight not exceeding 60 lb. to 61 lb. In Holstein the corn is heavier, weighing upwards of 62 lb., but inferior to the quality of 1834 in every respect. The vegetation of barley was checked by the dry and cold weather, which succeeded the sowing, and after the plant had sprung up, heavy rains falling, followed by excessive heat, proved injurious to the mature ripening of the grain. Many samples are found in consequence thin, coarse, and flinty, and generally far inferior to the crop of last year; some good parcels, however, are to be obtained, good in colour, and weighing 52 lb. to 54 lb. Oats are fine in colour, but light in weight, weighing only 36 lb. to 37 lb. the bushel; the quantity secured is estimated at a fair average. Peas and tares have yielded well in quantity and quality. Rapeseed has disappointed the anticipations of the grower, and is much below an average crop. In Holstein, however, the produce has been more favourable, owing to the fact, that much of the winter seed having failed, the ground in the spring was reploughed and sown with *aveel* and summer rapeseed, and the three crops have therefore turned out much more productive than the crop of last season. The crushers generally speak well of its oily qualities. Wheat at Copenhagen is quoted as high as 24s. 6d., owing to the effects of the hurricane. Barley, the old stocks of which have been exhausted partly by the demand for England in the early part of the year, and partly from the export to Norway, is bearing relatively a much higher rate than any other grain, being noted at 19s. to 19s. 6d. Oats sell for home consumption at 11s. White pease at 21s. to 22s. In Holstein the stocks of wheat being large, the currencies rule cheaper, wheat being obtainable at 22s. to 22s. 6d.; barley of fine quality 13s.; oats 9s.; rapeseed was bought at the beginning of the season at L.27 to L. 28 gradually advanced to L. 32 and L. 33 per ton, and then realised higher rates on the news arriving of the failure in the whale fisheries in Davis' Straits.

In *Holland* the wheat crop has been a full average, but the quality very irregular, and on the whole only middling, and inferior to the previous harvest, though superfine parcels may be selected. Rye has proved satisfactory in quantity and quality. Barley in the Zealand districts has turned out light and thin; but in the more distant provinces has yielded a much stouter and heavier sample. The oat crop it was feared would be very deficient; but though still below an average, is much better than was expected. Beans are deficient, and much injured by the worm. Pease a plentiful crop, and even in quality. Hempseed is reckoned one-third deficient in the produce, as compared with last year. Turnip-seed nearly a failure, hardly any stock of yellow remains on hand, and none of white. Rapeseed has yielded below an average, and less than anticipated. At the interested instigation of a few large landed proprietors, who have weight and influence with the *ruling powers*, a royal decree was issued, stating, that subsequently to the date of the ordinance, which is the 29th of September, there shall be given, besides the payment of the existing duties, sufficient security for the payment of the higher impost-duty, which shall in the sequel be imposed by the law which was to be proposed in the ensuing session of the States-General; making the amount of duty on the admission of wheat 66 florins 60 cents per last; on brank and rye, 24 florins 30 cents; on barley, 17 florins 40 cents; and 19 florins 80 cents on oats; reserving the option of the importer to deposite such imported corn into entrepot, according to the existing laws. This measure, as disadvantageous to trade as it will eventually prove to be detrimental to the very interests it is intended to serve, has given general dissatisfaction to the merchants, and petitions have been forwarded from different chambers of commerce, praying a revision of the order; while, on the other hand, the farmers are voting laudatory addresses to his Majesty, terming him "the father of his people." Wheat has in consequence advanced 3s. to 4s. per quarter, rye 2s. 6d., and barley 1s. 6d. to 2s.; rapeseed has continued advancing in value to L.40 per ton.

In *France*, the wheat crop has been abundant, though the yield, in comparison to the bulk of straw, has not been so plentiful as last season. On heavy soils, the rain which fell before the cutting lodged in exposed situations much of the corn, and the sample in consequence has been rendered uneven, and, owing to the continued heat which succeeded, the grain is often thin and light. Fine qualities are therefore scarce, and both old and new of this description obtain a higher comparative range of price. Flour throughout the summer has been relatively dearer than wheat, owing to the want of wind and water to work the mills; and, as confirmatory of the scarcity of water, and the difficulty agriculturists must have experienced in procuring it for their cattle, especially in Brittany, may be adduced the fact, that a fire which took place at Caen, was obliged to be extinguished with *cider*; and this beverage was also frequently used for culinary purposes. It is singular that the same groundless clamour which was lately raised in some of the English agricultural counties, excited by interested individuals for party purposes, in consequence of the alleged illicit importation of foreign wheat from Guernsey, Jersey, and the Isle of Man, and, as it was affirmed, with the cognizance of Government, which many farmers were made to believe was one of the principal reasons of the depressed state of the prices, and the consequent distress of the cultivators of the soil, has likewise prevailed in France, originating in the abuse of the permission granted in 1828, to the holders of foreign wheat in bond at Marseilles, to grind it into flour for export, principally to Algiers, and the illegal substitution of Barletta, and other fine foreign wheat, for similar quantities of inferior French produce, which had been smuggled into the interior, the very sight of which so alarmed the agriculturists, that they imagined the Government were sacrificing their interests, and allowing the markets to be inundated with foreign corn, to the ruin of the home grower. Official statements have appeared both here and in France, controverting these accusations; but in France the impression not having been totally effaced, M. Duchatel, Minister of Commerce, has just addressed a letter to the prefects, stating, that certain prejudices having arisen from unauthorized suppositions against the existing code of laws relating to grain, assuming that the low price of wheat was to be attributed to the extent of foreign importations, and that as many landed proprietors had been deceived by these rumours, it became necessary to give every publicity to their refutation. With this view, the minister has caused the imports and exports of grain during the first eight months of the present year to be published, together with the foreign grain in warehouse, which would in future be continued monthly.

The prices in France have continued, with one or two slight fluctuations, to decline throughout the present season, and are ruling lower than have been experienced for a series of years. The present monthly aggregate averages of wheat do not exceed 30s. 5d. to 31s. 2d., while the aggregate of the last seventeen years is 39s. 4d. per quarter.

Barley and oats have both suffered from the warmth of the weather, and the quality and quantity have in consequence been affected; barley is only an ordinary crop, and barely equal to that of last year. In Brittany, and the southern departments, the yield of oats has been good, but in other districts only middling, and in parts bad; the produce varying materially, according to the dryness of the weather, lightness of the soil, or exposure of the ground. The stock of old oats, however, having been completely exhausted, prices advanced, and were ranging at Paris from 20s. to 22s. 4d. The new corn has therefore been brought into immediate consumption, and obtained a more than relative value with other grain. Fodder has been very scarce, and there is much deficiency in both artificial and natural feed. The crop of clover-seed, first from the heat of the weather, and then the rains which have prevailed when the head was set, has fallen off considerably in the produce. Old seed has in consequence improved, and the best qualities are worth 46s. to 48s. per cwt.

In *Italy* the crops have been abundant, and secured in excellent condition, particularly in Tuscany. This circumstance, added to the increased supplies of corn from the Black Sea, and large shipments of old wheat ready to be effected, if required, from the Neapolitan States, has caused a material depression in the currencies throughout the Mediterranean. At *Naples*, Barletta wheat has receded to 19s. and 21s.; at *Ancona*, the quality is fine and yield good; at *Leghorn*, Tuscan white wheat was noted at 42s. 4d., and red 36s. 8d.; at *Trieste*, though the harvest in the province was fully an average, yet it was inferior in quality, and therefore fine wheats were in request at improving rates. In *Sicily*, the return has been plentiful, and wheat at

Messina had declined to 24s., barley and beans to 19s. The cholera, however, has been latterly a great impediment to commercial proceedings throughout the Italian States.

In *Van Diemen's Land*, by the latest advices, the prices of wheat was ranging high; and, by the accounts received also from Sidney, wheat continued to improve in value, being noted as high as 9s. to 11s. per bushel. At Hobart Town, the article was held at 8s. to 9s. per bushel. By advices from hence, dated at the end of May, it is stated the new moon has again set in dry, and nothing but hard frosts and barren heaths seem to be the portion of graziers during the next five months. In consequence of the hardness of the ground, the settlers deferred ploughing, but now they can delay it no longer. The consequence is, they are ploughing very shallow, and as the sowing will be late, a great deal of smut may be expected next crop. It is worthy of remark, that in a field of wheat sown last year, in the months of February, March, and April, that which was sown in February was quite free from smut; there was a little smut in the March seed, and more in the April. The land was good, and produced 30 bushels bright wheat per acre. Flour 25s., second 23s. per cwt.; hay L.6 per ton; oats 4s. to 4s. 6d. and 5s. per bushel.

At *Swan River* the number of acres of wheat in cultivation appears to be 546, of barley 100, oats 116, kaffie corn and maize 29, potatoes 15, other crops 94, fallow 118, vines half an acre. The live stock, consisting of 84 horses, 78 mares, 307 cows, 95 working cattle, 97 steers and bulls, 3545 sheep, 492 goats, and 374 pigs.

---

## ACCOUNT OF THE SHOW OF THE HIGHLAND AND AGRICULTURAL SOCIETY AT AYR.

The prospect of this great meeting excited a very lively interest in the west of Scotland; and from all accounts of the preparations which had long been making for it, it was expected to be the largest Show that had ever taken place under the auspices of the Society. These preparations were under the especial direction of the local committee, of which Mr T. F. Kennedy of Dunure was convener, assisted by the Lord-Lieutenants, Sheriffs, Conveners, and noblemen and gentlemen, of the counties of Ayr, Renfrew, Wigton, and Bute. The accommodation for the stock and spectators was ample and convenient. The show-yard occupied a space of about five acres of fine sward on a sandy soil, in what is called the Fort of Ayr, the square tower of the fort being included in the ground. This tower is the remains of the ancient church of St John the Baptist, in which, in former times, the Scottish Parliament met to confirm the title of Robert Bruce to the throne. The foundation of the church may still be traced, from which it appears to have been built in the form of a cross. Oliver Cromwell seized the church, which he converted into an armoury, and gave the borough 1000 English merks to assist in building the present one. Around the site of the church Cromwell built a fort, some parts of the walls of which are still to be seen near the harbour and elsewhere. It was defended by six bastions, contained two or three magazines, and covered twelve acres of ground. Upon this warlike spot was constructed the peaceful show-yard, which was enclosed with a high palisade formed of the trunks of young trees, exactly as the show-yards at Stirling and Aberdeen in the two preceding years. The interior was fitted up with pens for the different kinds of stock; a stage upon which the prize animals were exhibited; a spacious balcony for ladies; small tents and marquees for the Judges, and the exhibition of cheese and wool, and a large handsome square pavilion for the General Committee. The royal flags floating from the tops of the old tower and pavilion tended much to enliven the scene. Indeed the *tout ensemble* of the interior was very striking and pleasing, and seemed to call forth the approbation of the spectators. The stock, amounting to 760 in number, and comprising 150 more han at any other show, were all placed in their respective pens ithout the least confusion and accident by ten o'clock; the udges occupied the time till twelve o'clock, and at that hour the public were admitted on the payment of one shilling each, ., 825 being thus collected; so that including the men in charge the lots, more than 7000 persons were present at one time ithin the show-yard. The weather had previously been very iny and boisterous, but on the day throughout of Friday, 2d ctober 1835, the day of the Show, the sun never for once dis- ppeared. This was particularly favourable to the great number of ladies, "the bonny Ayrshire lasses," who honoured the exhibition with their presence.

The following were appointed Judges of the different kinds of Stock and articles exhibited: namely,

*For the Ayrshire Dairy Stock*:—Mr Wilson, Deanside; Mr Bartlemore, Seabrae; Mr Glen of Balgarran, Renfrew. *For the Ayrshire Fat Stock*:—Marquis of Tweeddale; Mr Wilson; and Mr Charge, Barton, Richmond. *For the Galloway Breed*:—Mr Murdoch, Dinvin, Port-Patrick, and Mr M'Ilwraith of Auchinflower. *For the Short-Horn Breed*:—Mr Charge, and Mr Crofton, Holywell, Durham. *For the West Highland Breed*:—Mr Macdonald of Craigruie; and Mr Graham, Newbigging. *For Cross-Breeds, and for any Breed*:—Marquis of Tweeddale, Mr Charge and Mr Crofton. *For Horses*:—Sir David Hunter Blair, Mr Dick, Veterinary Surgeon, Edinburgh; and Mr Cossar, Dunse. *For Black-faced Sheep*:—Mr Macdonald and Mr Graham. *For Cheviot Sheep*:—Marquis of Tweeddale, and Mr Graham. *For Leicester and Cross-bred Sheep*:—Mr Charge and Mr Crofton. *For Swine*:—Mr Crofton and Mr Graham. *For extra Stock, except Horses and Swine*:—Sir John Hope; Colonel Ferrier Hamilton of Westport; Mr Smith of Deanston; Mr Alexander Hunter of Doonholm; and Mr Stewart of Glenormiston. *For Implements*:—Mr Smith; Mr Slight, Curator of the Museum of the Highland and Agricultural Society, Edinburgh; Mr Symon, Errol; Mr Hamilton, Rozelle; and Mr Stewart. *For Roots, and Seeds and Honey*:—Mr Craufurd, of Craufurdland; Mr Lawson, Seedsman to the Highland and Agricultural Society, Edinburgh; and Mr Drummond, Stirling. *For Manufactures*:—Mr Hunt of Pittencrief; Mr Kirkman Finlay of Castle Toward; and Mr Roberts, Galashiels. *For Cheese*:—Mr Brown, and Mr Murray, Ayr. *For Ayrshire Needlework*:—The Marchioness of Hastings; Lady Jane Hamilton; Mrs Limond; Mrs Montgomery Hamilton; and Mrs Boswell.

## I. CATTLE.

1. *Ayrshire Breed*.—The first to be noticed of the various Classes of Stock brought forward in this part of the country, is naturally the Ayrshire Dairy Stock. In the Class of Ayrshire aged Bulls, sixteen competitors appeared. The first premium of twenty sovereigns was awarded to Mr John Baird, Highcross, Old Monkland, Lanark; the second of ten sovereigns to Mr William Peter, at Temple, East of Kilpatrick, Dumbarton. In this Class the Judges commended the bulls of Mr James Allan, Blackstone, Dalry, Ayrshire; and Mr Alexander Crichton, Middleton, Irvine, Ayrshire. In the Class of Bulls calved after 1st January 1833, the first premium was awarded to Mr John Gray, Tongue, Ayrshire; and the second to Mr David Hutcheson, Green, Renfrewshire. Besides the Premium Stock, the Judges in this class commended the Bulls of Mr James Jameson, Ladeside; and of Mr Thomas MacCreath, Belsleyhill, in Ayrshire. There were nineteen competitors in this Class. In the Class of Cows of the same breed, the first premium was gained by Mr William Hunter, Montford, Ayrshire; and the second by Mr Lawrence Drew, Carmyle, Lanarkshire. The Cows commended in the Class were those of Mr John Dunlop, Outmains, Ayrshire; and Mr Ebenezer Storrie,

Gavel Garden, Stirling. For the best Fat Cow of the same breed, not under four years old, the premium was awarded to Mr John Findlay, Lyonstone, Ayrshire. In the Class of Cows of the same breed, calved after the first January 1832, which shall have had a calf, or in calf on the day of competition, the premium was awarded to Mr John Black, Easterhouse, Lanarkshire. The Judges commended the Cows of Mr Hugh Kirkwood, Highlangmuir, and Mr James Templeton, Nethercraig, Ayrshire. In the Class of Heifers of the same breed, the number of lots was nineteen; the first premium was awarded to the pair of Heifers belonging to Mr John Findlay, Lyonstone; and the second to Mr Adam Skeoch, Ardrossan Mill, Ayrshire. The pairs of Heifers of the Class which received commendation were those which belonged to Sir Jas. Fergusson of Kilkerran, and Mr William Guthrie, Busbie, Ayrshire. For the best pairs of Quey Stirks, not exceeding twenty-one months old, of the same breed, the premium was awarded to Mr John Forrest, Sandylands, Lanarkshire. The pairs belonging to Mr William Jack, Little Shewalton, and Mr David Wright, Sanquhar, were commended. There were no fewer than twenty-two lots in this class. In the Class of the best Ox of the same breed, of any age, shewing most symmetry, fat and weight, the premium was awarded to the Marquis of Bute. For the best two Oxen calved after 1st January 1832, the premium of Ten Sovereigns was awarded to Sir David Hunter Blair; and for the pair calved after 1st January 1831, the premium of Ten Sovereigns was adjudged to the Marquis of Bute. The pairs of Oxen belonging to Mr James Kennedy, Lochlands, and Mr David Tennant, Hawkhill, Ayrshire, were commended.

2. *Galloway Breed.*—The next Class of animals to be mentioned is the Galloway breed. The number exhibited in this class was much less numerous than might have been expected from the proximity to the breeding district to which it peculiarly belongs. In the class of Bulls of this breed, the first premium of Fifteen Sovereigns was awarded to Mr William Brown, Endrick, Wigtonshire, and the second of Seven Sovereigns, to Mr Thomas Fergusson, Dinmurchie, Ayrshire. For the pair of Oxen of the same breed not under three years old, shewing symmetry, fat, and weight, the premium of Ten Sovereigns was awarded to Mr William Mure, Grange, county of Kirkcudbright; and for the best pair of Spayed Heifers, Mr Mure also gained the premium of Ten Sovereigns. The Judges were anxious to notice the pure breeding and symmetry of Mr Mure's stock, and particularly those of the Spayed Heifers. In the Class of Cows of the same breed the first premium of Ten Sovereigns was awarded to Mr Thos. Fergusson, Dinmurchie, and the second of Five Sovereigns to Mr William Sproat in Borness, Kirkcudbright. For the best two Queys of the same breed, the premium of Ten Sovereigns was awarded to Mr William Mure, on account of merit, although there were no competition in this class.

3. *Short-horned Breed.*—In this Class the competition could not be expected to be great in this quarter of the country, where so much attention is almost exclusively paid to the Ayrshire breed of cattle. In the Class of Bulls of this breed, nine were exhibited, and the premium of Twenty Sovereigns was awarded to Mr Thomas F. Kennedy of Dunure. The Judges expressed it as their opinion that the Bull belonging to Mr George Reid, Ballencrieff, East

Lothian, possessed great merit. In the Class of Cows of this breed, Mr Reid obtained the premium of Ten Sovereigns. For the best horned Ox of any age, the premium of Ten Sovereigns was awarded to Mr James Kennedy senior, Lochlands, Ayrshire, and in this class the ox belonging to Mr Hugh M'Jannet, Drumshang, possessed considerable merit.

4. *West Highland Breed.—Fat Oxen.*—In this Class, nine pairs were exhibited, and the animals were of superior order. The first premium of Ten Sovereigns was awarded to Colonel Boyle of Shewalton; and the second of Seven Sovereigns to Mr Hugh M'Jannet, Drumshang. The others which were commended by the Judges as possessing merit, were a pair belonging to the Hon. Colonel Macadam Cathcart, of Craigengillan; and a dun coloured ox, one of a pair, belonging to Mr George Dunn, Blairston Mains, Ayrshire.

5. *Cross-breeds.*—In this Class several premiums were offered for various crosses between the Short-horn, Ayrshire, and Galloway breeds. For the best Ox, a cross between the Ayrshire and Galloway breeds, shewing symmetry, fat, and weight, the premium of Seven Sovereigns was awarded to Mr Andrew Hendrie, Highfield, Ayrshire. For the best Ox, a cross between the Short-horn and Ayrshire breeds, the premium of Seven Sovereigns was awarded to Mr T. F. Kennedy of Dunure. The ox belonging to Mr Jas. Kennedy senior, Lochlands, in this class, possessed much merit. The premium of Seven Sovereigns for an Ox, being a cross between the Short-horn and Galloway breeds, was awarded to Mr William Marshall, Kirkland, Kirkcudbright. It may not be unworthy of remark, that in all cases of the crosses enumerated, the male seemed to have a preponderating influence in establishing the character of the progeny. For example, in the cross between the Ayrshire and Galloway, the Galloway bull had determined the character; in that between the Short-horned and Ayrshire, the Short-horned bull had decided the symmetry and points of the animals exhibited, although the character of colour, the breeds having both generally the same colour, could not be distinguished in the progeny; in that between the Short-horn and the Galloway, the Short-horn bull had decidedly imprinted its character on the animal exhibited. There was a remarkably large and heavy ox, a cross between the Galloway bull and Ayrshire cow, which was almost entirely *white*, and of course partook in colour neither of the sire nor dam; but still the polled head, general symmetry, substance, and a few *black* spots scattered over the white ground, indicated the influence of the male over that of the female. It would be curious to ascertain whether the dam of this ox had beheld any white object in the time of being served. The story of Jacob's "peeled rods" is no romance.

6. *Any Breed.*—In the Class of Oxen of any breed, the first premium was awarded to Mr Hugh M'Jannet, Drumshang; and the second to Mr William Rodger, Dalmorton, Ayrshire.

### II. HORSES.

In the Class of Draught Stallions, eighteen competitors appeared. The premium of Thirty Sovereigns was adjudged to Mr James Kirkwood, Gameshill, for his compact brown horse. Of Draught Brood Mares, none of them exhibited those superior properties for which the draught Stock in the adjoining county of Lanark has been so long celebrated. The first premium of

Ten Sovereigns was adjudged to Mr John Young, Nethertrees, Ayrshire; and the second of Seven Sovereigns to Mr James Fulton, Ballig. For the best Draught Gelding or Filly, the premium was awarded to Mr Hugh Crawford junior, Flat, Ayrshire. In the Class of Cleveland Stallions, the premium of Twenty Sovereigns was awarded to Mr William Mure, Grange, Kirkcudbright, for his handsome stallion.

## III. SHEEP.

1. *Black-faced Breed.*—In the Class of Black-faced Tups, the first and second premiums of Five and Three Sovereigns, were awarded to Mr Thomas Robertson, Broomlee, Peeblesshire; the premium of Five Sovereigns for the best pen of Black-faced Ewes, was also awarded to Mr Robertson. In the Class of Black-faced Gimmers, the first and second premiums of Five and Three Sovereigns were awarded to Mr Andrew Weir, Lindburn, Ayrshire. In the Class of Black-faced Dinmonts, the first premium of Five Sovereigns was awarded to Sir James Fergusson of Kilkerran; and the second to Mr Thomas Robertson, Bromlee. In the Class of Black-faced Wethers not under one year and eight months, and not exceeding three years old, the premium of Five Sovereigns was awarded to Mr William Rodger, Dalmorton; for Wethers not exceeding three years old fed on hill pasture, the premium of Five Sovereigns was awarded to Mr Limond of Dalblair, Ayrshire. In the class of Fat Black-faced Wethers of any age, the premium of Five Sovereigns was awarded to Mr David Tennant, Hawkhill, Ayrshire.

2. *Cheviot Breed.*—In the Class of Sheep of the Cheviot breed, the premium of Five Sovereigns was awarded to Mr Thomas Little, Pennyland, Dumfriesshire, for the best two Tups, as was also the Premium of Five Sovereigns for the best pen of Ewes of the same breed. To Mr Little was also awarded the premium of Five Sovereigns, for the best pen of Cheviot Gimmers.

3. *Leicester Breed.*—In the Class of Tups of the Leicester breed, there were thirteen competitors, and the premium of Five Sovereigns was awarded to Mr William Mure, Grange. The Judges commended another Tup of Mr Mure's as deserving of notice. For Leicester Ewes, the premium of Five Sovereigns was awarded to the Hon. F. Macadam Cathcart; and those belonging to Mr William Marshall, Kirkland, Kirkcudbright, were noticed by the Judges as possessing merit.

## IV. SWINE.

In the Class of Swine, the competition was pretty extensive. For Boars, the first premium of Five Sovereigns was awarded to Mr John Dunlop, Auchans; and the second of Three Sovereigns to Mr John Howat, Martanham, Ayrshire. For Sows, the first premium of Five Sovereigns was awarded to Messrs Watson and Grieve, Whitehill, Ayrshire; and the second of Three Sovereigns to Mr T. F. Kennedy of Dunure. In the Class of Sows, the property of cottars or tenants paying not more than L. 15 of yearly rent, the premium of Three Sovereigns was awarded to Mr William Boyd, Ayr. For Pigs not exceeding forty weeks old, the first premium of Five Sovereigns was awarded to Mr Andrew Dick, Genoch, Ayrshire, and the second to Mr T. F. Kennedy of Dunure. The sow belonging to Mr Breakenridge, Barbuston, was favourably noticed by the Judges.

## V. EXTRA STOCK.

As usual at all the Annual Shows of the Society, a considerable number of animals out of the range of competition were, for various causes, exhibited as extra stock. They consisted of bulls, cows, heifers, oxen, crosses, horses, sheep, fowls, &c. &c. The Judges particularly recommended the following among the extra stock as deserving of premiums, viz.:—A set of four Ayrshire cows, exhibited by Mr Finlay, Lyonstone; Ayrshire cows shewn by Mr Bruce, Langholm; Ayrshire cows shewn by Mr Kirkwood, High Langmuir; an ox, a cross between the Short-horn and Galloway breeds, exhibited by Mr Rodger, Craig; another, a cross between the Ayrshire and Galloway breeds, shewn by Mr Wright, Woodlands; a stot from St Kilda, fed by the Hon. F. Macadam Cathcart; a heifer and stirk, crosses between the Short-horn and Ayrshire, shewn by Sir James Fergusson of Kilkerran, Bart.; two tups exhibited by Mr Garrat, Northamptonshire; ten black-faced tup lambs, shewn by Mr Andrew Weir; ten black-faced ewe lambs, exhibited by Mr Thomas Fergusson, Dinmurchie; and a remarkably fine draught foal, shewn by Mr Jas. Meikle, Clockston, Ayrshire. The large poultry belonging to Mr T. F. Kennedy of Dunure, seemed to attract a considerable degree of attention.

## VI. IMPLEMENTS.

In the Class of Implements, the Judges examined every article exhibited with care, some of which are deserving of particular notice, for their ingenuity and aptitude to their respective uses and workmanship, which last particular reflects great credit on the artisans of the country. Of those articles which the Judges thought worthy of commendation, the Reaping Machine, exhibited by Mr Smith of Deanston, claims the first praise for the decided improvement he has effected in its principle of action, and for the substantial manner in which it is constructed. He also exhibited several models of drains. Mr John Cook deserves commendation for good workmanship in his three-horse and two-horse subsoil Ploughs, also Mr James M'Connel for a Subsoil Plough, and Root Slicer. Mr Alexander Reid of Bollingshaw, exhibited a method of equalising the draught of horses in thrashing machines, gins, &c.; an improvement in converting the common plough into a draining or trenching plough; several new methods of yoking horses in the plough and cart, whereby two or more horses are made to pull equally and together; a simple method of making carts accommodate themselves to equalize the pressure on the horses' back in ascending and descending inclinations of road; a very ingenious method of adjusting cart axles to dished wheels without any *set* or bend; and a very simple and cheap stomach-pump for cattle. Mr Alexander Boyd exhibited a very ingenious self-acting tide gauge, and harbour telegraph. Mr Robert Kerr, Stewarton, an elegant, useful, and economical bee-hive. Mr John Underwood, Ayr, a very ingenious double action pump. Dr Sloan of Kilmaurs, a safety traverse joint for carriages, whereby obstacles on roads may be passed over without risk of upsetting. Mr Thomas M'Cririck, smith, Garsallan, by Cumnock, an improved cheese-press, and a mathematical instrument to determine the set of coach and cart axles. Mr John Watson, Ayr, an ingenious model of a safety-lock, involving a new principle. The number of subsoil ploughs exhibited formed a very interesting feature, as it evinces the extension of the use of that important improvement. There was a subsoil plough of a lighter construction, sent from Stirlingshire, by Mr Murray of Polmaise, which was said to be of easy draught for two horses, at a depth of fourteen inches. The exhibition of drain tyles was also very encouraging, as shewing the extension of that first of improvements—thorough draining. It is believed that a great waste of capital is too generally incurred by the use of inferior tyles. Some tyles manufactured in Warwickshire, with models of the tools used in making them, were exhibited by Mr Hamilton of Rozelle, which were highly approved of by the Judges. These tyles are more uniform in shape and burning than those generally in use in this country; and they are stronger at the crown, and the edgings made firmer than the general body, to give a broader bearing on the ground, and which forms are accomplished in the making by a very simple process. Mr Robert Boyle, potter, Ayr, also exhibited some good specimens of Draining Tyles.

### VII. Roots and Seeds.

The exhibition of Roots and Seeds was particularly enhanced in interest by the well arranged collection of Messrs P. Lawson and Son, the indefatigable Seedsmen to the Society. Their collection consisted of 100 varieties of the cereal grains; 50 of the leguminous; upwards of 200 of the plants cultivated for their herbage, and 160 named varieties of the potato. It would perhaps be unnecessary to enumerate all the varieties of plants and other articles which were exhibited in this class, but a few of the more remarkable may deserve some attention. From Auchincruive was exhibited Chevalier barley weighing 57½ lbs. per bushel. A barley under the name of Pomeranian, which is a variety of the Hordeum hexaticon. A barley from the Alps, a variety of distichon. Specimens of Italian and Common Ryegrass in hay, from Mr Girdwood, manager at Kerrylamont, the home farm of the Marquis of Bute, shewing the comparatively great produce of the former. A fine sample of black oats imported from America by the late Earl of Cassillis in 1828, very productive of corn and straw, giving from 12 to 16 bolls per acre, and not liable to shake out with the wind. This is probably a variety of the *Avena orientalis*. A very fine sample and in the ear, of black barley from the Cape of Good Hope, exhibited by Mr Patrick M'Kinna, Gowkscroft. This is a variety of the distichon, but a different one from any that had ever come under the notice of the Judges. A sheaf of very fine barley and a bushel sample of the same, under the name of the Italian. It is a distichon, and resembling that known by the name of the Golden. This was exhibited by Mr Imrie, Seedsman. Messrs J. Smith and Son, Seedsmen, Ayr, exhibited the seed and plant of a new species of Heracleum, from Siberia, which, for its arge leaves and rapid growth, they consider suitable to the feeding of dairy cows. Messrs Lawson and Son exhibited the *Pinus Austriaca*, a plant superior to the *Pinus sylvestris* or *Laricio* in quickness of growth and durability of timber. Also plants of the *Pinus sylvestris*, from Haganoe in Germany, presenting a more rapid growth than the plant produced from the native *sylvestris* of this country. They had also twelve varieties of flax raised from seed procured from Russia last year. That variety called *usitatissimum-altissimum*, appears to possess superior properties. *Vicia villosa*, an annual growing seven feet in height, and the *biennis*, are worthy of experiment.

## VIII. Honey.

Fine specimens of Honey in the Comb, in wooden hives, were exhibited by Miss Margaret Henderson, Thornhill, Mr John Brown, Mr Alexander King, and Mr Robert Kerr, all from Stewarton.

## IX. Wool.

Of the competitors for Cheviot Wool, premiums were awarded to Mr Andrew Mitchell senior, Linfairn; and to Mr Peter Mitchell, Balloch Beatties, Ayrshire. A premium for Black-faced Wool was awarded to Mr Thomas Wilson, Altonalbany, Barr, Ayrshire, for the best lot.

## X. Woollen and Linen Manufactures.

This exhibition consisted of Carpets, Rugs, Flannels, Damask and Table Linen; a certain sum was recommended by the Judges to be given to some of the competitors. Messrs Gregory Thomson and Company, Kilmarnock; Messrs J. T. Deans and Company, Stewarton, and several others, were competitors.

## XI. Cheeses.

In this class of articles there was a general and keen competition, not fewer than forty-three competitors having appeared in the lists. The Judges expressed themselves highly gratified at the superior quality of all the kinds of cheese exhibited. The first premium was awarded to Mr David Dickie, Tanncriech; and the second to Mr James Wright, in Hillhouse, parish of Symington, for full Milk cheeses. In the Class of Skim Milk Cheeses, the premium was awarded to Mr Hugh Boreland, Wester Hillhouse. The premium for Imitation Stilton was awarded to Mr John Dickie, Middle Robertland. Mr Murray of Polmaise sent a cheese for exhibition, the whey out of which had been pressed by Mr Robison's air pump cheese-press.

In anticipation of a much more numerous company dining together on the day of the Show than any single room in Ayr could contain, the Local Committee had ordered, at considerable expense, a very large pavilion from London, capable of containing 1000 persons at dinner. The pavilion was very tastefully fitted up in the drill ground of the barracks; the large kitchen of which would have afforded accommodation for culinary purposes; but the severe storm of wind and rain of Monday evening injured it so much, that it was found impossible to repair and set it up again in time. This unfortunate accident threw much additional trouble on the Dinner Committee, of which Sir John Stuart Forbes, Bart. was convener. Accommodation was quickly fitted up in the Assembly and Court Rooms in the County Buildings, and in the Town-hall Assembly Room. The three chairs were occupied by the Marquis of Tweeddale, senior Vice-President of the Society, who on this occasion acted as President for the Duke of Gordon, who was abroad; by the Earl of Eglinton, a young nobleman of great promise, and popular among the farmers; and Mr Kennedy, convener of the Local Committee. The dinners were enlivened by the Earl of Eglinton's brass band. This meeting of the Society went off with great eclat; and, as an earnest of the interest which such meetings excite, several gentlemen from the Emerald Isle favoured it with their presence and approbation; among whom we must specially mention the names of Mr Maxwell of Finnybrook, County Down; Mr Legge, Malone

County Antrim ; and Mr Blacker, Armagh. The meeting of the Caledonian Hunt, with the races, served to keep the town of Ayr astir some days after the Show.

A trial of Mr Smith's, of Deanston, reaping machine was made at Mr Hamilton's of Rozelle, in a field of wheat. It executed its work well, though the state of the corn was by no means favourable. It cut the corn well, and laid it down nearly well. It is a modification of Mr Smith's former machine, and an apparent adoption of Mr Mann's principle, namely, the upright position of the laying drum, the teething of the drum to catch the corn in its revolution, and the high velocity of the cutters in comparison to that of the drum, viz. five times. Mr Mann's drum and cutters were polygonal, Mr Smith's circular. The weight of the machine, 19 cwt., is too great, and must be reduced before it can be easily worked. The time is not far distant, when a reaping machine will be invented of universal application.

This show terminated the course of shows which the Society had determined on holding in various parts of the country. At first the shows were tried experimentally at Edinburgh so far back as 1822, and that one having excited the public interest, others were attempted at the same place in the succeeding years till 1825, after which it was proposed to hold one at Glasgow. From that time they have become migratory, and in their progressive increase through the country, the agricultural community have fully responded to the call of the Society in bringing forward for exhibition fine specimens of all kinds of well-bred and high-fed stock. The simple statement of the fact, that at Glasgow in 1828, the number of animals exhibited, 302, being increased at Ayr in 1835 to 760; and the dinners being attended by an increase of from 250 to 900 persons—is sufficient to evince the increasing interest which the proceedings of the Society have created throughout the country. Heretofore the Society has invited and led the agricultural interest to these shows, the competition at which has been confined to Scottish stock. Henceforward the continuation of these migratory exhibitions on the same splendid scale, must in future depend on the desire of the agricultural interest to invite the Society to patronize their efforts. The Society has shewn the example, and proved that great shows are practicable. The agriculturists must follow that example, and illustrate the practicability of their continued existence. Whenever an invitation of three years' notice, with a guarantee for L.300 to assist the premiums, are given to the Society by the agriculturists of any district, the Society will, we are assured, second their views by the offer of liberal premiums for all the best kinds of stock. In this independent course we are happy to observe that the county of Perth has taken the lead, followed by the county of Dumfries, and the city of Glasgow, all of whom have given liberal invitations to the Society for the years 1836, 1837, and 1838. Let the Borderers present a handsome card for 1839.

As a record of the Society's progress hitherto, it may not be uninteresting to our readers to let them see at one glance the various places and times at which the Shows have been held.—1st Show was held on the 26th December 1822; 2d on the 10th December 1823; 3d on the 8th December 1824; and the 4th on the 7th December 1825, at Edinburgh, in the area behind Queensberry House; the 5th was held at Glasgow, on the 27th September 1826, in the New Cattle Market in Duke Street, which had just been finished; 6th at Edinburgh, in the Portable Gas Works, Tanfield, Canonmills, on the 5th December 1827; since then there has none been held in the metropolis; 7th at Glasgow, on the 24th September 1828, in the New Cattle Market; 8th at Perth, on the 7th October 1829, in the Depôt; 9th at Dumfries, on the 21st September 1830; 10th at Inverness, on the 21st September 1831, in the Academy Yard; 11th at Kelso, on the 4th October 1832, in a field at the end of the bridge belonging to Sir John Douglas; 12th at Stirling, on the 2d October 1833, in a space of ground in the King's Park, inclosed with pallisades for the purpose; 13th at Aberdeen, on the 3d October 1834, on the Links near the Bride's Hill, inclosed with pallisades; and 14th at Ayr, on the 2d October 1835, in Cromwell's Fort, inclosed with pallisades. Of all these Shows the greatest number of animals was at the last at Ayr, in 1835; but the finest quality of stock was shewn at Kelso in 1832, where the competition was thrown open to England. The competition in future will be open to the whole United Kingdom.

## MISCELLANEOUS NOTICES.

I. *On Moss Improvements.—By Mr A. Blackadder, Land-valuator and Surveyor, Allan Park, Stirling.*—Much has been written upon Moss as an agricultural soil, and many will be ready to conclude that nothing farther can be brought forward worthy of attention. Men of the first-rate talents and of extensive acquirements have studied its chemical qualities, and with every opportunity for observation and investigation, have, without prejudice, recorded facts. Agriculturists of enterprise and skill have made experiments with a view to reclaiming or improving mosses; yet, after all, on no subject are opinions more at variance. Theory is opposed to theory, facts opposed to facts, and experiments present the most opposite results. It is natural to ask, how is this? I am disposed to reply, that the true and only cause is, that little or no attention has been paid to the different kinds of moss; and this seems evident from the circumstance that none of the writers on the cultivation of moss give a full description of the nature and quality of the moss treated of, as if all mosses were the same; than which there cannot be a more fatal mistake, owing to which much money has most unprofitably been expended, and on account of these manifold failures, many have been deterred from attempting moss improvements, where the result would have been highly advantageous. This is a consequence not less to be deplored when we consider what a vast extent of the surface of the three kingdoms is under moss, and that its baneful effects are severely felt on the adjacent crops, from the cold and humid atmosphere which its presence engenders; for who does not know that in very few seasons will even oats or potatoes come to maturity in the vicinity of moss; and that, in our best seasons, they are inferior, owing to the early frosts rendered more intense by copious evaporation.

It is therefore proposed to state some things essential to be kept in view before entering upon moss improvement, viz. The subsoil—the order of the super-position—the comparative thickness of the subordinate moss strata, and their diversified composition—the state in point of humidity and capacities for drainage—proportion of commixed earthy matters—superficial alluvial depositations—substances acting as decomposing applications—the nature and uses of the adjacent rocks and their earthy covers—and the prospects of improvement.

*Subsoils of Moss.*—These formed the common surface soil prior to the growth of the moss, and are as diversified as can be supposed. If they are deep and rich, and the superincumbent moss of a moderate depth, the most lucrative course, where other circumstances concur, is to float off the moss entirely, and cultivate the subsoil, as has been done to the extent of some thousand of acres in the Vale of Forth, in Scotland; but if it cannot be floated off, and is only one or two feet in depth, a similar permanent improvement may be effected by ploughing and burning, until the subsoil is reached. Again, if the moss is shallow, and the subsoil sand, or such like inferior soil, the best improvement is a top-dressing of one or more inches, to be obtained by casting out the subsoil from parallel ditches, and, however poor the quality, it will decompose the moss, and produce a good pasture. But another reason for examining the subsoil is, that the richer it is, other things being equal, the richer the nature of the plants which it originally produced, and also that of the subsequent peat earth. Nor should it be forgotten, that not unfrequently the subsoil of moss is a valuable shell marl.

*Composition of Moss Proper.*—Every one at all conversant with moss, knows the worthlessness of "flow moss" (the produce of Sphagnum, Hypnum, &c.) either as a soil or for fuel, and it is indeed the most indecomposible of plants of so soft a texture; unhappily it is of all others the most prevalent in the less elevated mossy grounds. If, therefore, it forms the surface cover, any prospect of a high degree of fertility must necessarily be distant; but if it be covered by a stratum of decayed heath, bent, cotton grass, &c. the quality of the moss soil is much better. Other mosses are chiefly composed of reeds (arundo), horse tail (equisetum), trefoil (menyanthes trifoliata), sedge (iris), rushes (juncus), &c., such more readily decompose, and form a much richer soil than either of the former. Nothing so well determines the quality of moss as the plants which it spontaneously produces; for the moss soil and its products are nearly of the same substance, and the crop of the preceding years is the soil in which the next crop vegetates. Again the moss plants now vegetating indicate the degree of moisture; for so soon as a permanent saturation is effected, the sphagnum, &c., is produced to the almost total exclusion of the other plants; but on the water being drawn off it dies, and is succeeded by heath and sundry coarse aquatic grasses; or, if rendered sufficiently dry, bent grass prevails. If decomposition is by any means effected, then rushes, and also the finer pasture-grasses, supplant the latter. While moss plants continue still to grow, it is evident that the depth of moss must be still on the increase, and this by reason of the antiseptic qualities of its products; but where by any means pasture-grasses, or even rushes, abound, it is manifest that the proper moss is in a state of decay, decomposition has commenced, and a very different soil is presented, and of course a different treatment is called for. Had these circumstances been brought under notice by writers on moss improvement, not only would their conflictiing statements have been avoided, but immense sums saved, or applied usefully and to permanent advantage, which oftentimes have been worse than thrown away.

*Depth, Humidity, and Draining.*— Mosses of great depth, or vertical thickness, and having a nearly level surface, are generally more elevated, softer, and more fluid towards their central portion. It is a common practice to encircle them with a main drain, which indeed prevents flooding from higher grounds, but has little or no effect in draining the area of the moss field. The main drain should invariably pass through the centre of the softest or deepest part of the moss; and although that should be the highest, it will very soon become the lowest, and produce a subsidence and inclination towards it, on all sides. It is commonly objected to this course, that the moss is too soft to admit of it; and, indeed, if the drain is at the outset made more than one foot in depth, the matter thrown out will soon press the sides together, or even cause the bottom to swell up. This difficulty is, however, not insurmountable, if operations are carried on gradually, and if at the same time with the main drain, smaller ones are led off from it, at right angles, in parallel straight lines, and only made deeper as the moss consolidates. In the vicinity of a large river, or of the sea, the whole excavated moss of the principal drains may better be floated off; and where too elevated to admit of a stream of water being brought over it for that purpose, the main drain may be deepened for a time,

merely by the rain water collected on the surface. This course
ally employed in a drain a mile and a half in length, in Blair
moss, in Perthshire, under the eye of the writer, and under the
his father. The moss was eighteen feet deep, and so soft that
necessary even in the dryest season to support the feet from
only walking over it; and indeed on one occasion it burst out
many acres of the adjoining arable plain, and surrounded several
mounting every obstacle adopted to obstruct its course. Wh
nature of moss, it is on all hands agreed that no improvement
without draining. Yet it must be a primary consideration, whet
circumstances, the expense even of draining would be well bestow
were even the pernicious effects on vegetation and animal life in
estimate; yet on the latter account it is most desirable that all
effectually drained. The facilities for this purpose ought indeed
the first inquiries, and that not merely whether there is a super
tion, such as might be sufficient for draining other soils, but als
lowance for the subsidence of the moss consequent on drainin
average one-fifth of its depth. If there be a permanent stream
main drain, liable to occasional increase, allowance must be made
be sufficient to contain the whole, and thereby avoid all floodin
wise no drain in any kind of moss need exceed four or five feet
for covered drains a depth of three feet is quite sufficient.
straight, and parallel to each other, and discharging into larger
drains, and being distant from each other from twenty-four to fort
according to the nature of the moss, will in general be found qu
There is no danger of overdrying moss by draining; but there
ger of this being done by trenching; moss should never be stirred
to a greater depth than eight or nine inches.

*Manures, &c. for Decomposing Moss.*—Adjacent rock strata
carefully explored, as in general they have each their correspo
covering more or less adapted to the purposes of vegetation. Wh
are of the primitive class, or of the coal formation, their disint
tions, and oft-times their superficial covers, are of inferior value
even the rock earth of the latter, as also of clay-slate, lime, or
red sandstone, though not previously mingled nor superimposed
are yet valuable as ingredients of composts for top-dressing; as
of the purer sandstone, greenstone, and sea sand, containing cal
ters in a state of decomposition, or even when these are absent.
laid over moss produces rapid decomposition, and consequent v
such effect is produced by the purer clays. Putrescent matters,
mal or vegetable, possess the most powerful influence. Lime, u
post, seems to have no such effect on simple mosses; and its effe
mosses, or those in a state of partial decomposition, must depend
tum of foreign matter and other circumstances. Examples mi
in illustration, and also of numerous failures in moss improve
have nevertheless been lauded as if attended with complete succ
ing these and some other matters, a future opportunity may p
forded for offering further remarks.

*Prospects of Advantage by Improvement.*—The value of mo pends on local circumstances; and particularly with regard to the supply of operatives at the commencement of improvements; access to putrescent manures; markets for the sale of the produce; soils affording materials for top-dressing; and turf suitable for wedge-drains; or for drain-tile, or stone for drains, or clean gravel if found preferable; the expense at which these can be laid down at the moss must enter into the calculation. Or, again, if the moss is to be entirely removed, whether an adequate supply of water can be obtained with access to a river or to the sea into which it may be floated off. Nothing adds more to the intrinsic value of moss than mixtures of other soils during the progress of its formation, either by means of the winds carrying drift sand, or by water transporting earthy particles. When, again, a considerable quantity is thus superimposed, the soil ceases to be a moss, properly so called, and is an alluvial soil upon a moss subsoil. In either case little more is required than thorough draining, in order to the production by ordinary means of the best crops; and such is the description of the greater part of the mosses hitherto successfully improved in Scotland. There are, however, more of this description of mosses than is generally supposed, for the commixion of foreign materials is not easily detected by the eye, excepting by the inspection of dried portions in a strong light after being recently broken across, when the minute siliceous particles become sufficiently apparent.

*N.B.* The obvious results, merely, of the addition of silicious sands to mosses, have been brought under notice in the preceding remarks. Were the principle upon which the sand operates satisfactorily determined, it would doubtless form a valuable acquisition to agricultural science.

II. *A Cultivated Moor.*—The following is a sketch of an attempt to cultivate a moor, dashed off by a hand, the productions of which can never be mistaken. The moral of this graphic picture is, that there is a wrong as well as a right way of improving a moor.—*The Moor.* It was then ever so many miles long, and ever so many miles broad, and nobody thought of guessing how many miles round; but some dozen years ago it was absolutely measured to a rood, by a land-louper of a surveyor—distributed—drained—enclosed—utterly ruined for ever. No—not for ever. Nature laughs to scorn acts of Parliament, and we predict that, in a quarter of a century, she will resume her management of that moor. We rejoice to hear that she is beginning already to take lots of it into her own hands. Wheat has no business there—and should keep to the carses. In spring she takes him by the braird till he looks yellow in the face long before his time,—in summer, by the cuff of the neck till he lies down on his back and rots in the rain,—in autumn, by the ears, and rubs him against the grain till he expires, as fashionless as the winnle-straes with which he is interlaced,—in winter she shakes him in the stook till he is left but a shadow, which pigeons despise. See him in stack at Christmas, and you pity the poor straw. Here and there bits of bear or bigg, and barley, she permits to flourish; nor is she loth to see the flowers and shaws and apples on the poor man's plant—the life-sustaining potato—which none but political economists hate, and all Christians love. She is not so sure about turnips, but as they are a green crop, she leaves them to the care of the fly. But where are our gowans gone? There they still are, in flocks which no cultivation can scatter or eradicate—inextinguishable by all the lime that was ever brought unslokened from all the kilns that ever glowed—by all the dung that was ever heaped, fresh and fuming from the Augean stables in the land. Yet her heart burns within her to behold, even in the midst of what she abhors, the large dew-loved heads of clover whitening or reddening, or with their rival colours amicably intermingled, a new birth, glorious in the place of reedy marish or fen, where the cat's-paw nodded—and them she will retain into herself when once more she rejoices in her Wilderness Restored. And would we be so barbarous as to seek to impede the progress of improvement, and to render agriculture a dead letter? We are not so barbarous—nor yet so savage. We love civilized life, of which we have long been one of the smallest, but sincerest ornaments. But agriculture, like education, has its bounds. It is, like it, a science, and woe to the country that encourages all kinds of quacks. Cultivate a moor! educate a boor! First understand the character of clods and clodhoppers. To say nothing now of the urbans and suburbans—a perilous people—yet of great capabilities; for to discuss that question would lead us into lanes; and as it is a long lane that has never a turning, for the present we keep in the open air, and abstain from wynds. We are no enemies to poor soils, far less to rich ones, ignorantly and stupidly called poor, which under proper treatment effuse riches; but to extract from paupers *a return* for the expenditure squandered by miserly greed on their reluctant bottoms cold and bare, is the insanity of speculation, and such schemes deserve being buried along with their capital in quagmires. Lord! how they—the quagmires—suck in dung! You say they don't suck it in—well then, they spew it out—it evaporates—and what is the worth of weeds? Lime whitens a moss; that is true, but so does snow. Snow melts,—what becomes of lime no mortal knows but the powheads—them it poisons, and they give up the ghost. Drains are dug deep now-a-days—and we respect Mr Johnstone. So are gold mines. But from gold mines that precious metal—at a great expense, witness its price—is exterred; in drains that precious metal, witness wages, is interred, and then it becomes *squash*. Stirks starve—heifers are hove with windy nothing—with oxen frogs complete in bulk, with every prospect of a successful issue; and on such pasturage where would be the virility of the Bulls of Bashan?—*Anglimania. Blackwood's Magazine for August* 1835.

III. *On the Failure of the Potato Crop. By a Farmer.*—In a late number of the *Prize Essays of the Highland Society*, some essays are given on the failure of the potato crop. I hope I shall be allowed, through the medium of this paper, to offer a few remarks on some of the statements made. "We may state at once," say the authors (Messrs G. and J. Macdonald), "that we attribute the disease to the *heating of the seed*, and to that cause *alone*." This is no doubt a bold start, but I would ask, is it not as erroneous as bold? Are not hundreds of instances on record in England, Scotland, and Ireland, of failures having occurred, where it was well known the seed *had not* heated, and where the sets, after being cut, were spread thin, so as to prevent heating—a precaution which most people adopt—and that failure ensued notwithstanding? Is it not a fact that in Ireland, where potatoes continue to be planted with the spade in lazy-beds, that in numerous instances the sets on one-half breadth of each bed which were covered in the fore part of the day succeeded, while those on the other half, left uncovered till the after part of the day, failed, the seed being the same, and all laid down in rows across the bed, at the same time? Is it not a fact that many poor cottiers, particularly in Ireland, did, in the spring of 1833, and the spring of 1834, purchase a bushel of potatoes each, for seed, for their garden plots; that on reaching their places of residence with these potatoes, they forthwith cut them into sets; that one-half or two-thirds of these sets were planted immediately after being cut; that the remaining one-half or one-third—too small a body surely to heat—remained unplanted for eight or ten days, owing to some cabbage plant beds, or something of that kind, being in the way, and which required to be disposed of before the remainder of the sets could be planted; that when planted they entirely failed, while those put in when fresh cut grew vigorously? Referring again to Ireland, where this crop is grown so extensively, is it not a fact, that in all the heavy clay land districts there, the failure was greater than in light land districts; and that in all coarse rough ground, the failures prevailed to a greater extent than they did where the land was fine? And it is to be presumed that the occupiers of clay land were equally careful in the management of their sets, and were not more likely to have them heated than the occupiers of light land. Is it not a fact also, that where the dung applied was coarse, long, and strawy, and where consequently the ground was kept open and dry about the sets, that there the failures prevailed, and that they did not prevail where the dung was sufficiently decomposed, and the ground fine, the same seed being used, and which were cut and laid promiscuously? And thus it was that we frequently saw failures at one end of a drill, and fine plants at the other end. Is it not a fact, too, that experiments were made in 1834, and which have been largely and successfully acted on in 1835, of forming a skin over the fresh cut surfaces of the sets, by rubbing them on lime powder, and thus to exclude the atmospheric air and retain the moisture in the sets; that when treated in this way, although they remained unplanted for a considerable time afterwards, they grew vigorously if the seed was juicy, by being chosen from unperfected roots, though languidly if the seed was hard, dry, and farinaceous, by being cut from thoroughly perfected roots; but still they grew, shewing the value of the protective process, while those sets from the same parcel of potatoes, cut on the same day, and exposed for the same length of time, but wanting such protection on their cut surfaces, failed entirely? Is it not a fact, moreover, that all the *red skinned* sorts of potatoes failed to a much greater extent than those of any other colour. This circumstance has been satisfactorily accounted for, but it would be impossible to do so on the heating principle.—All these questions must be answered in the affirmative, and this being the case, it is clear that the failures cannot be attributed to the heating of the seed. The Messrs Macdonald have anticipated their readers, and have asked themselves the following question:—"If heating has been the cause of injury to the potato crop of last year throughout the kingdom, why were not the same effects produced in former years?" Here, indeed, was a poser for Messrs Macdonald, and so they seem to have found it; for what is their reply? Why, "that partial failures of the crop may have arisen from the same cause in former years, but being partial, they did not attract general notice."—How unsatisfactory! A supposed cause (heating of the seed) existed, which effected a very general, and at one time an alarming, failure in the potato crops of 1833 and 1834; and the same cause existed, we must suppose, every year, or if you will, every second, third, fourth, or fifth year, for two hundred years before, and yet no failure took place, or so trifling as not to attract notice! Comment is quite unnecessary. One circumstance which here presents itself, must strike every reader as extraordinary—it is, that though the Messrs Macdonald, judging from what they conceive to have been the cause of their own failure, have set down *heating* as the cause of all the other failures over the country, have yet *no proof* that their own potatoes heated. They only think they heated—a mere surmise altogether; for what is the fact? In their year of failure they cut their seed, they say, two or three weeks before planting, and stored them in heaps in a shed, or by the side of the pit, as they had been accustomed to do in former years; but they do not say that they examined these heaps and found them hot, nor do they say that on removing them to be planted, the slightest indication of their having heated presented itself, nor are we told that the droppers felt them warm in their hands—no such thing, but after they are all planted, and have rotted, the Messrs Macdonald begin to have a "settled conviction that in these heaps the seed was damaged by heating;" and the attempt to prove this is curious enough. It is as follows:—"With reference to the failure of our crops, we have already stated that the seed when cut was laid up in heaps, from these heaps the five persons employed filled their baskets, at one time from the *outside*, and at another time from the *centre* of the heap. The seed taken from the outside having undergone little or no heating, produced the healthier plants, while those from the centre having been entirely destroyed, produced nothing; and thus we account for the uniform appearance of five, ten, fifteen, or twenty drills (always fives) whether healthy, weakly, or a blank." Now, it does appear to be a very extraordinary circumstance indeed, that from a heap said to be composed of sound, of partially destroyed, and of totally destroyed potato sets, *all the sound* sets (to produce the "healthy" plants) should have been first lifted by the five droppers, and that they *did not lift one more nor one less than the exact number which were sound*, not leaving one sound set, nor taking one which was partially destroyed. And that the five droppers did, secondly and simultaneously, lift from off the same heap, *all the partially destroyed* sets, and *those only* (to produce the "weakly" plants), not one more nor one less; that is to say, not leaving one partially destroyed set among the "entirely destroyed" ones, nor lifting one "entirely destroyed" set along with those partially destroyed. And that the five droppers should, by mere chance, allow to remain for the third lifting *exactly all* the "entirely destroyed" sets (to shew the "blank"), not one sound nor one partially destroyed set among them. One would suppose this correctness to have been unattainable, unless the sets had been pointed out to the droppers by some distinctive mark, such as having them painted three different colours, or characterizing each lot of sets by a specific brand, as H. for healthy, W. for weakly, and B. for blank! Here it will be seen that a correct conclusion is attempted to be drawn from false premises, and here we have the public opinion influenced, erroneously I think, and injuriously therefore to the public cause, by a great society sanctioning a doctrine, by awarding a premium to the propounders of it, merely because they have a "settled conviction" that they are right, without a shadow of anything like proof being offered. On this principle, all the essayists on the subject might have claimed a premium, for they had all no doubt settled convictions of the correctness of their several opinions respecting it. We are told that "in April and May of both years the heat of the sun was great, while we had frequent warm showers, which contributed to produce heating in the seed heaps," &c. Well, these assistants to the heating cause did not exist during the present season, for April and May of 1835 were cold, with cold showers, and yet we hear of numerous failures in different parts of the three kingdoms; still the Messrs Macdonald "are of opinion that on no principle but that of heating could the failure be accounted for." It may be very true that such is their opinion, and it may be equally true that there is another principle on which the failures may be much more satisfactorily accounted for. All the facts stated in the commencement of this paper, and many more of a parallel nature, which have occurred during the present season, shew, that the failures have been caused by an impure atmospheric influence injuriously affecting the set through the cut part of it; and that wherever the sets have been exposed to it, either by being a considerable time cut before being planted, or (which amounts to the same thing) by the ground being rough and open, or the dung long and strawy, when they were planted—failures have ensued. Does not the Messrs Macdonalds' own experience prove this? All their sets planted when *fresh cut* grew, and what is still more decisive evidence, is, that any *whole* potatoes which happened to be among their *old cut sets* grew, while the latter failed; and here a question suggests itself—If, during the last three seasons a single *whole* potato grew vigorously, why, during the last three seasons, have two, three, or four sets, cut from a single potato, and remaining exposed for some time afterwards, failed, which it is known they have? Is heating the cause here? Is it possible that two, three, or four sets, being placed together, could heat? and if it is not, then, I ask, must it not be on *some other* principle than that of heating, that the failures are to be accounted for? In fine, to realize a luxuriant field of potatoes, such as the writer of this article could shew at present, it is only necessary to see that the following operations are well performed:—First, a thorough spring preparation of the ground, in other words, working it well with plough, harrow, and roller, so as to accomplish complete pulverization, taking care to free it from root weeds as the work proceeds; second, to use dung which is sufficiently decomposed; third, to choose for seed those potatoes which *have not ripened* or come to perfection the previous year, this is a very important point; fourth, to cut the sets large and strong; fifth, to plant them as soon as possible after being cut, or not to cut them till the ground is ready; to turn the cut side downwards, and to cover them as soon as possible. With this management a good braird of plants will be obtained, and having this, their future rapid and vigorous growth and ultimate produce will depend a good deal on the attention paid to their cultivation by the summer operations of horse and hand hoeing.—*Belfast News Letter.*

IV. *Foreign Corn and Flour Trade.*—It appears that persons engaged in the above trade have for some time past been making representations to the government on the subject of allowing the manufacture of foreign corn into flour for export. It is presumed that some members of the government, and particularly the Board of Trade, are favourable to the measure, but that much opposition to it is expected from the agricultural interest. The principle proposed to be acted upon is, that for every specified quantity of foreign wheat delivered out of bonded warehouses, there shall be a commensurate quantity of flour and biscuit returned within a limited time. To effect this, it is not conceived to be necessary that the produce of the identical parcel of wheat taken out of bond should be returned, provided the quantity of wheat liable to be brought on the English market does not exceed that which will be taken out of it. With regard to the quality of the flour and biscuit to be exported, the only essential point appears to be, that it shall be in every respect wholesome human food, such as is commonly used on board merchant ships, or in our colonies. This would be more beneficial to all parties than a nicer definition, since it sometimes happens, from accidents of weather, &c. that there may be a considerable quantity of English wheat not well adapted for loaf-bread, which would yet make very good biscuit. If, then, a quantity of this description of wheat were taken out of the English market, and an equal quantity of better quality of foreign wheat brought into it, the effect would be that the farmer would be relieved from an unsaleable article, and the public have the advantage of better bread. Still, if it be made a point of, that the quality of the flour and biscuit to be returned into bond shall be more strictly defined, the criterion might be the flour and biscuit usually made for the navy. To guard against fraud, it is proposed that the operation, as far as regards the exchange of wheat for flour and biscuit, shall be under the superintendence of the Customs, and confined to the principal sea-ports, in the following manner:—On timely notice being given that a certain quantity of a specified cargo of wheat is wanted to be manufactured into flour or biscuit, the party making the application shall, with another responsible individual, give security by bond, to return into the bonded warehouse within a limited time a certain quantity of flour and biscuit, or of flour or biscuit only, as the case may be, for the purpose of exportation, instead of the specified quantity of wheat so liberated; otherwise, if it should be deemed more satisfactory, the biscuit and flour may be deposited into bonded stores, and sufficient time allowed for their being examined and approved of previous to the delivery of the wheat. The officer of the Customs may be at liberty to call in tradesmen to inspect the quality of the flour and biscuit, to assist his judgment of quality; and if he should reject it, and the owner of it be dissatisfied with his decision, an appeal may be made to the collector of the customs, whose decision shall be final. —Those regulations, it is presumed, would effectually prevent any liability to fraud, which, however, might still be subject to penalties provided in similar cases. So far would this system be from injuring the agriculturists, that it would be of positive advantage to them, inasmuch as it would bring into active operation a large capital now lying dormant in foreign corn, and also by bringing back a branch of trade once enjoyed, but now lost to this country, through the operation of the existing corn laws; it would do away one of the causes of complaint made against them, and shew that the agriculturists do not desire to interfere with other interests beyond what is necessary for their own protection.—It must be borne in mind that the benefit to be derived from the plan ought not to be confined to the corn now in bond, but be of a permanent nature. That it can be carried on to great advantage, is obvious from the fact, that wheat can often be brought from the Baltic, and laid down in England, at a less price than it bears in America, which annually exports upwards of 1,000,000 barrels of flour, besides a large quantity of biscuit, chiefly to our West India Islands and South America.—The system would necessarily give freight to our shipping, both in corn from the Baltic, and flour and biscuit to the West Indies, Newfoundland, South America, &c., and would afford additional employment in this country to a great number of millers, bakers, coopers, bagmakers, &c.—The foregoing plan would have the recommendation that it may be carried into effect with very little increase of expense to the Crown.—Should doubts be entertained as to the working of such a system, the experiment might, in the first instance, be made of the wheat now in bond, the capital in which, amounting to a million and a half of money, is rapidly sinking by expenses of warehouse rent, labour in preserving it, interest of money, and general deterioration in quality.—*Times.*

V. *Upton's Rotatory Lever Engine and Boiler.*—The advantages of the engine are:—1. It occupies only a seventh part of the space of the common reciprocating beam engine of equal power. 2. It has neither engine-beam, crank, connecting-rod, parallel motion, governor, air-pump, hot-water cistern, nor any of the attendant expenses. 3. It is so constructed that, whether single or double, the steam operates upon the extremity of a lever, the fulcrum of which is the axis of the engine, as well as of the resisting force, as in the case of paddle wheels fixed at each end thereof, or of coach-wheels for locomotion on land. 4. It costs less in the first purchase, and does not require a tenth part of the expense in fixing or repairs, as compared with a beam-engine. 5. It can be made to operate alternately in opposite directions, by reversing the motion of the steam. 6. It is perfectly controllable, and may be set to work or stopped instantly by any person whatsoever, if necessary. 7. It has not half the friction of common beam-engines, and, consisting of only about a dozen parts, will prove infinitely less liable to derangement, and thereby greatly increase the demand for them. 8. It can be entirely put together in the manufactory, and will require only a few days' fixing, instead of weeks, as beam-engines always occupy. 9. It is admirably adapted for team cultivation, being the best constructed engine for steam-ploughing, grist mills, and other agricultural operations. 10. It is the best application of steam-power for canal, river, and sea navigation; can be fixed to the kelson of a ship, and the axis protruded through the sides by means of perfectly secure stuffing boxes, so that the paddles may be always under water, and more out of the way of the enemy's shot. 11. It will weigh the anchor, pump the ship, and discharge and take in the cargo. 12. It requires less fuel than beam-engines of equal power, and, by occupying less space, leaves more stowage-room for goods. 13. It will be found, from its simplicity and compactness, the best application of steam-power for railways or common roads, and the most profitable engine for manufactories and mining operations. 14. It will propel a carriage at the rate of fourteen miles the hour, including stoppages for water and fuel. 15. It will not weigh,—including boiler-carriage, 16 passengers, half a ton of luggage, 75 gallons of water, and 3 sacks of coke in reserve,—more than 5 tons.

The advantages of the boiler are:—1. Its decided superiority over all other boilers yet made, consists in its being founded on the well-known principle of an air-furnace, which of all others is the best adapted for purposes of combustion, and generating the most intense heat with the least possible expense. 2. It weighs less than any other boiler yet made, generating the same quantity of steam. 3. It is safer than any other boiler, as it carries its fuel and water in separate compartments, the giving way of any one of which does not interfere with the others. 4. It is stronger than any other boiler, from the peculiarity of its construction. 5. It consumes less fuel than any other boiler yet made. 6. It works either as a high or low pressure boiler. 7. It raises steam in less time than any other boiler, and is fed from the top, but may be constructed to be fed otherwise if required. 8. It is more durable than any other boiler, and any one of the compartments for generating steam may be taken out and repaired, or replaced by duplicates, in a few hours. 9. It is the best adapted boiler for shipping ever discovered, being lighter, more compact, fed from the deck, and perfectly safe by not carrying its water in bulk; nor can any danger result, even should one of the steam chambers give way after long wear and tear; besides which, it stands on its own legs, and requires no fixing or brick work. Notwithstanding which, its heat is prevented from being acted upon by the surrounding atmosphere, and the steam is collected and preserved in one of its chambers, placed in the midst of the fire and boiling water. 10. It is the best boiler ever made, whether for stationary or locomotive purposes, on land or water.—*John Upton, Agricultural and Locomotive Steam-Engine Manufactory, 7 New Street, Southwark Bridge, London.*

---

## QUARTERLY AGRICULTURAL REPORT.

November 1835.

The ample *exposé* of the corn trade, both foreign and domestic, which appears in this Number of our Journal, precludes the necessity of enlarging on this Quarterly Report, and suggests the propriety of withholding the Foreign Corn Markets altogether. What we shall therefore say, will be confined to a description of the present crop, by a gentleman to whom we have before been indebted for valuable information regarding the corn trade in Scotland; and a few remarks on the condition of the live-stock presented at the principal autumnal markets. Before entering on these particulars, we must premise, that after much coarse, windy, wet weather in June and July, the crops grew rapidly in the beginning of August, and were succeeding quickly towards maturity, when the rain again commenced on the 25th August, and continued with little intermission to the end of September. Some farmers had secured some barley and wheat whilst the weather continued good, but by far the largest portion of the crop was exposed to the rain. Discoloration of course ensued, and sprouting was generally apprehended; but the low state of the temperature, and the watchful activity of our farmers, rendered the threatened evil almost innocuous. The humidity of the atmosphere must have been in a peculiar state when it discoloured the straw, for frequently the side of the stooks farthest from the rain was most discoloured. The carbonic acid in rain water, of which it constitutes an hundredth part, may act upon and thereby discolour the straw, but since the discoloration is sometimes effected beyond the reach of the falling rain, some other agent than rain must be in active operation. In damp calm weather, of which there were several days in the harvest, a haze may have been seen rising from the ground in the evening, and as this haze settled most thickly on the side of the stook farthest from the direction whence any motion of the air was felt, it is not improbable that it may have been the immediate cause of the discoloration, which this season, in many instances, we observed of a very dark tint. It was endeavoured to be proved by Dr Pratt, of Exeter, that water is decomposed during its evaporation, so that the liberated state of the carbonic acid or oxygen in haze may account, by its action on the straw, for all the phenomena of discoloration of straw in damp weather.

Of the state of the crops, as ascertained by our friend, it is as follows:—"Wheat, we have every reason to believe, will rather exceed an average crop in quantity, though more various in quality than for several years past. A very small proportion having been secured before the heavy rains in the end of August, it is more or less injured, though a good useful article, weighing, generally, from 61 lb. to 63 lb. per bushel. Barley we think the most productive crop we have known in Scotland, and although for the most part dark in colour, is remarkably stout and heavy, weighing generally from 52 lb. to 55 lb., and some samples even as much as 57 lb. to 58 lb. per bushel. It is found to malt extremely well, even at this early period, and will improve much in colour when some time in stack. A considerable quantity of barley has been brought from England, under the impression that the Scotch barley had been injured in its malting qualities, from the alarming state of the weather during harvest; but it is now found that we shall have an ample quantity of good malting barley in Scotland. Oats, from requiring more moisture than wheat and barley, suffered much in the early part of the season, and coming considerably later into maturity, they were exposed to more of the unfavourable weather, and are consequently much stained, and a large proportion is injured by sprouting. In quantity, we have no doubt they will be found rather short of an average. The general weight of potato-oats is 41 lb. to 44 lb., and of Angus or feed-oats, 39 lb. to 42 lb. But, in such a season, there are many samples of all kinds of grain sadly defective in every respect; and there is as yet no possibility of forming any accurate opinion as to the proportion which these will bear to the total produce of the harvest. Beans and pease are exceedingly various in point of produce, but are supposed to be about an average crop. Potatoes, which have so great an influence on the corn trade, are rather under an average produce per acre; but from the increasing breadth planted, there is every prospect of their being plentiful, and moderate in price. There is a fair stock of old Scotch wheat remaining on hand, and a large quantity having been imported, and still arriving, from England, there is every probability of the price of new wheat being materially depressed, by the great abundance of old. Of old oats and barley we have rarely known so very little left to meet the new crop."

This has been the most dilatory harvest within our recollection, having seen some corn cut as early as the middle of August, and some uncut as late as the middle of October; and, as the dilatory state of the crop enabled farmers in many instances to cut it down with their own work people, this has consequently been a season of sad disappointment to many hundreds of poor Irish labourers who came over to the harvest.

The prices of cattle and sheep have declined considerably since last autumn. The immediate cause of the depression arises, no doubt, from the almost total failure of the turnip crop in England; and Scotland has long since learned, by dear-bought experience, the important knowledge, that when the food of animals is scarce in England, the Scotch stock-markets become glutted to excess. Although the turnip crop is by no means fine, yet it is certainly better than that in England. This well known fact, creating a dread of the want of demand from England, may serve to account for the short supply, comparatively, of stock, which have been brought forward to the great autumnal markets. Neither the September nor October Falkirk Trysts had the same supply as usual by 20,000 cattle, and yet the prices were lower. Nevertheless, stock are not much cheaper, comparatively with their condition; for it has seldom been our lot to see so many lean and so few fat cattle and sheep as have been exhibited either at the Falkirk Trysts, or at All-Hallow Fair at Edinburgh, on the 9th November. Sellers would not submit to the price at which buyers anticipated they would be able to purchase. The consequence has been, that these markets were dull and dilatory, and many of the best lots were driven away to the south, to run the risk of the English markets; and should the winter prove an open one, and but few lots follow in their wake, the owners of these lots may there yet realize for them tolerably good prices.

---

## THE REVENUE.

*ABSTRACT of the Net Produce of the Revenue of Great Britain, in the Quarters and Years ended on the* 10*th of October* 1834, *and* 10*th of October* 1835,—*showing the Increase and Decrease on each head thereof.*

| | Quarters ended Oct. 10. | | Increase. | Decrease. | Years ended Oct. 10. | | Increase. | Decrease. |
|---|---|---|---|---|---|---|---|---|
| | 1834. | 1835. | | | 1834. | 1835. | | |
| | £ | £ | £ | £ | £ | £ | £ | £ |
| Customs, . . | 4,950,500 | 5,353,987 | 403,487 | . . | 16,225,261 | 18,498,212 | 2,182,951 | . . |
| Excise, . . . . | 3,924,785 | 4,007,375 | 82,590 | . . | 13,946,348 | 11,681,197 | . . | 2,265,151 |
| Stamps, . . . . | 1,659,008 | 1,671,204 | 12,196 | . . | 6,601,884 | 6,505,224 | . . | 96,600 |
| Post-Office, | 366,000 | 372,000 | 6,000 | . . | 1,362,000 | 1,396,000 | 34,000 | . . |
| Taxes, . . . . | 508,714 | 355,120 | . . | 153,594 | 4,726,195 | 3,733,997 | . . | 992,198 |
| Miscellaneous, | 1,712 | 16,513 | 14,801 | . . | 45,518 | 76,737 | 31,219 | . . |
| | 11,410,719 | 11,776,199 | 519,074 | 153,594 | 42,907,206 | 41,891,367 | 2,248,170 | 3,353,949 |
| | Deduct Decrease, . . | | 153,594 | | Deduct Increase, | | | 2,248,170 |
| | Increase on the quarter, | | 365,480 | | Decrease on the year, | | | 1,105,779 |

## TABLES OF PRICES, &c.

*Average Prices of the different kinds of GRAIN, per Imperial Quarter, sold at the following Markets :—*

### LONDON.

| te. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 35. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| 31. | 47 7 | 28 4 | 24 4 | 31 6 | 38 6 | 39 2 |
| g. 7. | 46 5 | 28 0 | 24 9 | 30 6 | 38 9 | 39 3 |
| 14. | 44 9 | 27 4 | 25 6 | 30 6 | 38 8 | 39 0 |
| 21. | 43 2 | 26 0 | 24 2 | 30 4 | 38 2 | 38 7 |
| 28. | 42 4 | 26 4 | 22 1 | 30 4 | 37 6 | 39 7 |
| t. 4. | 42 0 | 27 1 | 22 0 | 29 8 | 36 0 | 36 4 |
| 11. | 41 4 | 25 11 | 20 0 | 30 6 | 33 2 | 34 5 |
| 18. | 40 4 | 28 0 | 20 3 | 31 6 | 33 6 | 32 11 |
| 25. | 39 11 | 28 2 | 21 3 | 32 0 | 32 2 | 32 5 |
| t. 2. | 40 3 | 29 3 | 21 2 | 31 8 | 31 4 | 31 11 |
| 9. | 41 0 | 30 9 | 22 1 | 31 2 | 30 8 | 30 3 |
| 16. | 40 10 | 31 6 | 21 0 | 30 6 | 31 0 | 31 1 |
| 23. | 39 9 | 30 11 | 21 0 | 30 10 | 30 6 | 31 1 |

### DUBLIN.

| Date. | Wheat Per Bar. 20 St. | Barley Per Bar. 16 St. | Bear Per Bar. 17 St. | Oats Per Bar. 14 St. | Flour Per Bar. 9 St. |
|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. |
| July 31. | 26 0 | 13 6 | 11 4 | 13 6 | 13 6 |
| Aug. 7. | 26 6 | 13 4 | 11 6 | 13 6 | 13 8 |
| 14. | 26 0 | 13 0 | 11 6 | 13 0 | 13 2 |
| 21. | 24 6 | 12 6 | 11 0 | 13 0 | 13 6 |
| 28. | 24 0 | 12 6 | 10 6 | 12 9 | 13 3 |
| Sept. 4. | 24 0 | 12 6 | 10 8 | 12 6 | 13 6 |
| 11. | 23 6 | 12 2 | 10 6 | 12 0 | 13 2 |
| 18. | 20 6 | 13 6 | 10 6 | 13 0 | 13 6 |
| 25. | 20 0 | 13 6 | 10 0 | 13 0 | 13 6 |
| Oct. 2. | 20 0 | 13 0 | 10 6 | 13 0 | 13 3 |
| 9. | 20 6 | 13 2 | 10 0 | 12 6 | 13 0 |
| 16. | 20 0 | 12 6 | 10 2 | 12 6 | 13 6 |
| 23. | 20 0 | 12 0 | 10 0 | 12 0 | 14 6 |

### LIVERPOOL.

| te. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 35. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| g. 4. | 42 7 | 27 7 | 23 8 | 31 8 | 38 2 | 39 4 |
| 11. | 40 10 | 27 8 | 23 10 | 31 5 | 38 6 | 39 9 |
| 18. | 41 6 | 26 7 | 23 7 | 30 6 | 37 2 | 39 7 |
| 25. | 38 11 | 26 6 | 19 7 | 30 10 | 36 2 | 39 5 |
| t 1. | 39 8 | 27 2 | 22 2 | 30 8 | 35 4 | 39 2 |
| 8. | 39 2 | 26 4 | 20 0 | 31 2 | 35 6 | 39 1 |
| 15. | 39 11 | 26 10 | 20 8 | 30 6 | 36 6 | 39 11 |
| 22. | 37 8 | 26 0 | 21 1 | 31 5 | 37 10 | 39 8 |
| 29. | 38 4 | 26 6 | 20 3 | 30 4 | 36 8 | 40 1 |
| t. 6. | 35 3 | 25 8 | 19 2 | 30 2 | 36 10 | 39 9 |
| 13. | 35 8 | 24 9 | 19 4 | 31 0 | 37 4 | 36 11 |
| 20. | 35 8 | 26 7 | 19 6 | 30 6 | 37 6 | 37 0 |
| 27. | 34 11 | 27 10 | 18 11 | 30 0 | 36 10 | 36 0 |

### EDINBURGH.

| Date. | Wheat. | Barley. | Oats. | Pease. | Beans. |
|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Aug. 5. | 47 0 | 30 6 | 27 0 | 37 0 | 37 6 |
| 12. | 48 0 | 31 0 | 28 0 | 37 0 | 38 0 |
| 19. | 46 10 | 31 6½ | 27 10 | 37 6 | 37 8 |
| 26. | 48 0 | 32 9 | 27 0 | 37 0 | 37 6 |
| Sept. 2. | 46 0 | 32 0 | 27 0 | 37 6 | 37 10 |
| 9. | 44 8 | 31 6 | 26 9 | 37 0 | 37 6 |
| 16. | 44 3 | 32 0 | 26 2 | 36 6 | 37 0 |
| 23. | 44 0 | 30 4 | 26 3 | 37 0 | 37 9 |
| 30. | 44 3 | 30 4 | 25 6 | 37 0 | 37 4 |
| Oct. 7. | 42 6 | 30 0 | 24 6 | 36 6 | 37 0 |
| 14. | 44 0 | 30 2 | 24 0 | 36 8 | 37 6 |
| 21. | 42 8 | 29 9 | 24 1 | 36 0 | 36 6 |
| 28. | 41 10 | 30 3 | 24 3 | 37 2 | 38 0 |

*TABLE shewing the Weekly Average Prices of GRAIN, made up in terms of 7th and 8th Geo. IV. c. 58, and the Aggregate Averages which regulate the Duties payable on FOREIGN CORN; the Duties payable thereon, from 1st August to 1st November 1835.*

| | Wheat. | | | Barley. | | | Oats. | | | Rye. | | | Pease. | | | Beans. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | |
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. |
| 1. | 44 0 | 41 11 | 45 8 | 28 4 | 28 6 | 19 10 | 24 5 | 24 0 | 10 9 | 31 3 | 31 5 | 22 9 | 38 1 | 39 8 | 11 0 | 40 2 | 40 3 | 9 |
| 7. | 43 2 | 42 5 | 44 8 | 28 0 | 28 5 | 19 10 | 24 8 | 24 2 | 10 9 | 30 2 | 31 2 | 22 9 | 33 10 | 38 2 | 12 6 | 40 1 | 40 3 | 9 |
| 4. | 42 6 | 42 10 | 44 8 | 27 9 | 28 3 | 19 10 | 25 3 | 24 5 | 10 9 | 30 4 | 31 3 | 22 9 | 32 6 | 37 2 | 14 0 | 39 7 | 40 1 | 9 |
| 1. | 41 1 | 42 9 | 44 8 | 27 8 | 28 2 | 19 10 | 24 0 | 24 6 | 10 9 | 30 4 | 30 5 | 24 3 | 32 6 | 36 2 | 15 9 | 39 10 | 39 1 | 11 |
| 3. | 40 4 | 42 5 | 44 8 | 26 10 | 27 10 | 21 4 | 22 3 | 24 3 | 10 9 | 29 8 | 30 5 | 24 3 | 33 1 | 34 11 | 18 3 | 37 9 | 39 9 | 11 |
| 4. | 39 5 | 41 9 | 45 8 | 28 4 | 27 10 | 21 4 | 21 6 | 23 8 | 12 3 | 30 8 | 30 5 | 24 3 | 35 3 | 34 3 | 18 3 | 38 2 | 39 5 | 11 |
| 1. | 38 10 | 40 11 | 46 8 | 27 6 | 27 8 | 21 4 | 20 7 | 23 0 | 12 3 | 29 5 | 30 1 | 24 3 | 35 9 | 33 10 | 19 9 | 36 8 | 38 11 | 1 |
| 8. | 38 0 | 40 0 | 46 8 | 27 8 | 27 8 | 21 4 | 20 5 | 22 4 | 13 9 | 31 5 | 30 4 | 24 3 | 36 9 | 34 4 | 18 3 | 35 2 | 38 1 | 1 |
| 5. | 37 7 | 39 2 | 47 8 | 27 9 | 27 7 | 21 4 | 20 4 | 21 6 | 15 3 | 29 6 | 30 2 | 24 3 | 36 0 | 34 11 | 18 3 | 34 10 | 37 3 | 14 |
| 2. | 37 1 | 38 6 | 48 8 | 28 2 | 27 8 | 21 4 | 19 9 | 20 9 | 16 9 | 30 10 | 30 3 | 24 3 | 35 11 | 35 6 | 16 9 | 34 5 | 36 6 | 1 |
| 9. | 37 0 | 38 0 | 48 8 | 28 3 | 27 11 | 21 4 | 19 10 | 20 5 | 16 9 | 30 5 | 30 5 | 24 3 | 35 9 | 35 11 | 16 9 | 33 9 | 35 6 | 1 |
| 6. | 36 11 | 37 7 | 49 8 | 28 3 | 27 11 | 21 4 | 19 5 | 20 8 | 16 9 | 29 8 | 30 2 | 24 3 | 35 10 | 36 0 | 16 9 | 34 7 | 34 11 | 1 |
| 3. | 37 0 | 37 3 | 49 8 | 28 11 | 28 2 | 19 10 | 19 8 | 19 11 | 18 3 | 28 0 | 30 0 | 24 3 | 35 1 | 35 11 | 16 9 | 35 1 | 34 8 | 1 |

*The MONTHLY RETURNS, published in terms of 9th Geo. IV. c. 60, showing the Quantiti Corn, Grain, Meal, and Flour imported into the United Kingdom in each Month; the Quan upon which duties have been paid for home-consumption, during the same Month; and the Q tities remaining in Warehouse at the close thereof: from 5th August to 5th October* 1835.

| Month ending | IMPORTED. From Foreign Countries. | IMPORTED. From British Possessions. | IMPORTED. Total. | CHARGED WITH DUTY. From Foreign Countries. | CHARGED WITH DUTY. From British Possessions. | CHARGED WITH DUTY. Total. | REMAINING IN WAREHO From Foreign Countries. | REMAINING IN WAREHO From British Possessions. |
|---|---|---|---|---|---|---|---|---|
| g. 5. 1835. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. |
| heat, . . | 4,012 2 | 2,310 4 | 6,322 6 | .. | 2,888 3 | 2,888 3 | 577,654 3 | 47,967 3 |
| rley, . . | 1,021 1 | 0 2 | 1,021 3 | 38 4 | 0 2 | 38 6 | 93,836 5 | 25 1 |
| ts, . . | 22,282 3 | .. | 22,282 3 | 2,858 2 | .. | 2,858 2 | 390,907 5 | 666 0 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 4,942 6 | .. |
| ase, . . | 555 5 | 91 2 | 646 7 | 890 3 | 6 0 | 896 3 | 11,963 1 | 85 2 |
| ans, . . | 11,046 0 | .. | 11,046 0 | 34,669 5 | .. | 34,669 5 | 17,322 1 | .. |
| Totals, . | 38,917 3 | 2,402 0 | 41,319 3 | 38,456 6 | 2,894 5 | 41,351 3 | 1,089,596 5 | 48,743 6 |
| Sept. 5. | | | | | | | | |
| heat, . . | 13,448 7 | 3,716 5 | 17,165 4 | 15 5 | 1,696 1 | 1,711 6 | 579,275 7 | 49,178 7 |
| rley, . . | 7 4 | .. | 7 4 | 17 6 | .. | 17 6 | 79,440 4 | 25 1 |
| ts, . . | 27,811 7 | .. | 27,811 7 | 68,119 3 | .. | 68,119 3 | 342,083 2 | 666 0 |
| ye, . . . | .. | .. | .. | 3 3 | .. | 3 3 | 3,476 3 | .. |
| ase, . . | 2,274 0 | 0 1 | 2,274 1 | 8,046 1 | 0 1 | 8,046 2 | 4,847 2 | 85 2 |
| ans, . . | 6,952 5 | .. | 6,952 5 | 22,888 1 | .. | 22,888 1 | 1,622 4 | .. |
| Totals, . | 50,494 7 | 3,716 6 | 54,211 5 | 99,090 3 | 1,696 2 | 100,786 5 | 1,010,745 6 | 49,955 2 |
| Oct. 5. | | | | | | | | |
| heat, . . | 6,574 0 | .. | 6,574 0 | 3 1 | 807 7 | 811 0 | 577,730 2 | 48,659 0 |
| rley, . . | 4 2 | .. | 4 2 | 77 6 | .. | 77 6 | 64,124 1 | 25 1 |
| ts, . . | 7,066 7 | .. | 7,066 7 | 103,893 7 | .. | 103,893 7 | 237,458 7 | 666 0 |
| ye, . . . | .. | .. | .. | .. | .. | .. | 3,476 3 | .. |
| ase, . . | 1,749 2 | .. | 1,749 2 | 39 2 | 85 2 | 124 4 | 5,965 0 | .. |
| ans, . . | 308 7 | .. | 308 7 | 448 5 | .. | 448 5 | 1,502 7 | .. |
| Totals, . | 15,703 2 | .. | 15,703 2 | 104,462 5 | 893 1 | 10,355 6 | 890,257 4 | 49,350 1 |
| g. 5. 1835. | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb |
| our, . . | 2,280 0 24 | 919 1 25 | 3,199 2 21 | 11 0 12 | 2,490 2 0 | 2,501 2 18 | 284,885 0 9 | 31,897 3 17 |
| atmeal, . | 7 0 22 | .. | 7 0 22 | .. | .. | .. | 12 3 20 | .. |
| Totals, . | 2,287 1 18 | 919 1 25 | 3,206 3 15 | 11 0 12 | 2,490 2 0 | 2,501 2 18 | 284,898 0 1 | 31,897 3 17 |
| Sept. 5. | | | | | | | | |
| our, . . | 6,094 2 3 | 8,421 1 11 | 14,515 3 14 | 2 0 0 | 6,127 1 6 | 6,129 1 6 | 279,395 3 19 | 33,663 1 22 |
| atmeal, . | 127 0 17 | .. | 127 0 17 | .. | .. | .. | 121 3 21 | .. |
| Totals, . | 6,221 2 20 | 8,421 1 11 | 14,643 0 3 | 2 0 0 | 6,127 1 6 | 6,129 1 6 | 279,517 3 12 | 33,663 1 22 |
| Oct. 5. | | | | | | | | |
| our, . . | 10,733 2 21 | 11 0 20 | 10,744 3 13 | 10 1 19 | 7,319 3 5 | 7,330 0 24 | 259,224 1 15 | 24,192 0 17 |
| atmeal, . | .. | .. | .. | .. | .. | .. | 75 1 8 | .. |
| Totals, . | 10,733 2 21 | 11 0 20 | 10,744 3 13 | 10 1 19 | 7,319 3 5 | 7,330 0 24 | 259,299 2 23 | 24,192 0 17 |

## *PRICES of BUTCHER-MEAT.*

| Date. | SMITHFIELD, *Per Stone of* 14 lb. Beef. | SMITHFIELD, *Per Stone of* 14 lb. Mutton. | MORPETH, *Per Stone of* 14 lb. Beef. | MORPETH, *Per Stone of* 14 lb. Mutton. | EDINBURGH, *Per Stone of* 14 lb. Beef. | EDINBURGH, *Per Stone of* 14 lb. Mutton. | GLASGOW, *Per Stone of* 14 lb. Beef. | GLASGOW, *Per Stone of* 14 lb. Mutton. |
|---|---|---|---|---|---|---|---|---|
| 1835. | | | | | | | | |
| Aug. | 6/9 @ 7/3 | 6/3 @ 6/9 | 6/6 @ 7/ | 6/ @ 6/9 | 6/3 @ 7/ | 6/ @ 7/ | 6/6 @ 7/6 | 6/3 @ 7/ |
| Sept. | 6/6 7/3 | 6/3 6/9 | 6/3 7/ | 6/ 6/6 | 6/ 7/ | 6/ 6/6 | 6/6 7/9 | 6/3 |
| Oct. | 6/3 7/ | 6/ 6/6 | 6/ 6/6 | 6/ 6/3 | 6/ 6/6 | 5/9 6/3 | 6/6 7/3 | 6/ |

## *PRICES of English and Scotch WOOL.*

ENGLISH, per 16 lb.—*Merino*, Washed, 27/ @ 31/; in Grease, 21/ @ 25/.—*South Down*, 2?/ @ *Leicester*, Hogg, 23/ @ 26/6; Ewe and Hogg, 21/ @ 24/.—*Locks*, 13/ @ 16/; *Moor*, 10/6 @ 12/6.

SCOTCH, per 24 lb.—*Leicester*, 42/ @ 46/6; Ewe and Hogg, 36/ @ 40/.—Ewe, 32/ @ 34/.—Chevi White, 27/ @ 33/6 Washed, 21/ @ 24/; Laid, 19/6 @ 21/; *Moor*, White, 14/ @ 16/; Laid, 11/ @ 12/.

THE

QUARTERLY

JOURNAL OF AGRICULTURE.

## ON THE VARIETIES OF CLIMATE AND PRODUCTIONS IN THE RUSSIAN EMPIRE.*

BEFORE entering on the immediate subject of this dissertation, it may not be superfluous to take a brief view of the causes of diversity of climate in general. These may be divided into common, natural, and local, the latter not following, but to a certain degree changing, the ordinary laws of nature.

To the common and natural causes belong, first, the principal and well-known one of latitude; and, secondly, the longitude; for it is ascertained, that, in the northern parts of Europe and Asia, the climates of places situated on the same degree of latitude become colder in proportion to their eastern longitude. But this increased severity of climate extends only to a limited distance eastward, gradually diminishing again as we approach the eastern ocean. Thirdly, the greater or less elevation above the sea: thus, in Mexico, on the elevated table lands, in the interior of that vast country, the mean heat of the year is only 10° (Reaumur). In general, the more elevated the situation the greater the cold, so that the summits of all the highest mountains are covered with eternal snows.

To the accidental and local causes of variation of climate belong the vicinity of the place to the ocean, or to some other great expanse of water; the quantity of forest; the position of the hills and valleys; the shelter afforded from the most prevalent cold or hot winds; the nature of the soil, and its more or less advantageous slope towards the south. The climate of a whole province may be beneficially affected by the change or removal of one or more of the above causes, as, for instance, the clearing away of superfluous forests, the draining of bogs, and even the cultivation of the soil. But the excessive or total destruction of the woods of a country is injurious to its climate as connected with the fertility of the soil.

---

* For this interesting paper we are indebted to Mr Hickson of St Petersburg. Mr James Heard translated it from the Supplement to the Agricultural Gazette published in that city. The article is supposed to have been written by an eminent statesmen of the Russian empire.—EDITOR.

The local causes which affect climate are various in their nature, some favourable, and others unpropitious to the growth of plants and the labours of the agriculturist. In sheltered spots, and on a fertile soil, we sometimes see fruits and plants arriving at perfection, which, by their nature, would seem to belong to a more southern degree of latitude. Not only plants and animals are affected by these local variations of climate; but man himself is not exempt from their influence. But perhaps in no instance is their effect so strikingly visible as in vineyards, where one spot will produce wine of a superior quality, while another, at no great distance, and equally well exposed to the rays of the sun, will furnish a very inferior sort. The vicinity of a river, the nature of the soil, and the slope of its surface, are perhaps the principal causes; but these shades of difference in the local nature of a climate have no influence on its general character. There are some extraordinary instances of sudden transition, where the districts are separated, even in a longitudinal direction, by a chain of mountains or a river. This is observable on the Vistula, the Nieman, and the Dneiper, where a sensible increase of cold may be felt on the eastern side. Sometimes the most striking phenomena proceed from these accidental causes; it is well known, that diversified as is the climate of the various regions of the globe, the transition from the cold to the warm is exceedingly gradual; but there are many exceptions, where, by the influence of local circumstances, the productions of the south are fostered in the north, although they may again disappear in places of a still more southern latitude, or western longitude.

With these few preliminary observations we shall now proceed to our more immediate subject, and divide Russia into the following climatic regions. 1st, *The region of ice.* 2d, *The region of moss.* 3d, *The region of forests and pasturage.* 4th, *The region of barley, and the beginning of agriculture.* 5th, *The region of rye and flax, or of settled agriculture.* 6th, *The region of wheat and fruit.* 7th, *The region of maize and the vine.* 8th, *The region of the olive-tree, the silk-worm, and the sugar-cane.* Such is the vast gradation from north to south. What immense resources must a country possess that embraces such an extent of territory and diversity of climate!

In adopting this division of climatic regions, it must be remembered, that they do not run exactly parallel to the equator, but decline to the south, in proportion as they extend eastward, without noticing those more minute varieties of temperature produced by accidental causes, which carry these imaginary boundaries sometimes more to the south, at others more to the north, as, for instance, on the summits of the Ural Mountains, where the cold is severe, or in some sheltered spots on the rich soil of the government of Vologda, where it is unnaturally genial.

1. *The Region of Ice.*—The icy region may be considered as including Novaya Zemlia,[*] part of the Kolskaya district, and the extreme northern points of land which project into the Frozen Ocean. This region is distinguished by a night of three months' duration, and its total destitution of vegetable productions, which circumstances render it unfit for the permanent habitation of man and domestic animals. The seal, the walrus, and fish of various descriptions which abound towards the pole, supply the only means of sustenance for man, the polar bear, and its inseparable companion the fox; except on Novaya Zemlia, where multitudes of a peculiar kind of mice breed, and lay up heaps of roots for their winter store. These mice serve, in their turn, as food for the bears and foxes.

The maritime enterprizes undertaken by the commercial house of Brandt in Archangel, may probably furnish us with more authentic information concerning these parts. They have been conducted with as much courage as perseverance, and although the profits arising from them may in some measure supply the place of agriculture, yet they cannot be said in any way to be connected with it.

---

[*] Or the New Land, incorrectly marked on the English globes and maps *Nova Zembla.*

2. *The Mossy Region,*—where the ever-frozen ground is covered with a kind of greyish moss, and towards the boundaries of the following region, with a kind of dwarf brush-wood and fir. This tract is endowed by nature with an animal that alone makes it habitable for man, the rein-deer. Its vast deserts stretch from Archangel, along the shores of the White Sea to the Eastern Ocean, peopled by thinly scattered nomadic tribes of Laplanders, Samoyades, Ostiaks, and other aborigines, whose numbers are gradually decreasing as they come in contact with civilized nations. Besides the resources derived from the milk and flesh of the rein-deer, a considerable portion of the population is supported by fish.* The chase of marine animals, and such as furnish valuable furs, affords the principal employment of the inhabitants. Besides which, innumerable flocks of swans, wild geese, and other aquatic birds of passage, visit them during their short summer, and form an important part of their sustenance. Lastly, in this region, adjacent to the Frozen Ocean, at the mouth of great rivers, and near certain islands, are found those astonishing remains of antediluvian animals, particularly of the mammoth, and here was discovered that enigma for naturalists, the bones of one of those monsters, still covered with flesh and sink.

3. *The Region of Forests and Pasturage.*—By degrees the dwarf trees and brushwood of the mossy region increase in size, until we come to those immense forests, where the hand of man has not yet disturbed the majestic operations of nature. Along the banks of the rivers, and in other spots unincumbered with wood, the grass shoots up with astonishing rapidity; but the lingering frosts of spring, and the early appearance of those of autumn, prevent the cultivation of corn. For this reason the inhabitants of the northern part of this district, are principally occupied with the chase, especially that of the squirrel, an ani-

---

* To counteract the ravages of the scurvy the inhabitants employ a kind of cochlearia.

mal that seems to be indigenous there, and which forms the principal inducement for man to take up his abode in this inhospitable clime. The abundance of grass in the southern part affords the means of keeping cattle, while in some sheltered spots appear a few corn-fields, as it were, the outposts of agriculture. The northern and eastern parts of this region are inhabited by nomadic tribes, then follow the Finns or Finlanders, a settled people chiefly dependent on pasturage for support. It would be difficult to mark with precision the southern boundaries of this region, as it falls gradually into the next.

4. *The Region of Barley, and the Beginning of Agriculture.*—On account of the shortness of the summer, and the early autumnal frosts, barley is the only grain successfully cultivated here, but, with great care, several kinds of vegetables may be brought to maturity, and possibly potatoes might thrive. The inhabitants are Russians, Finns, Zirians, and others having settled habitations; but from the insignificance of their agriculture, they have recourse to grazing, fishing, and the chase, floating of timber, &c. In some parts, however, of the governments of Archangel and Vologda, are to be found a very superior breed of horned cattle. The southern limits of this region may be said to extend nearly to the town of Yarensk in the government of Vologda, and the parts of a corresponding degree of latitude, viz. the 63°. Nature, as the author himself had an opportunity of observing, here assumes an imposing aspect; immense forests, vast rivers, beautiful meadows, flourishing in all the unexhausted luxuriance of primitive vegetation, make an impression on the traveller that can only be adequately conceived by those who have wandered through the unexplored forests, and beheld the majestic streams of the New World.

5. *The Region of Rye and Flax, or of settled Agriculture,*—extends from the limits of the former, southward to the middle of the government of Tchernigov, or to the 51st degree of northern latitude, and the districts on the corresponding line to the eastward. It would be superfluous to enter into a minute description of this vast region, which comprises the principal part of the

Russian Empire; we shall therefore content ourselves with a few partial observations.

It will readily be conceived, that the southern part has some advantages over the northern, although they are not of such a striking nature as to demand a separation; it may even be said these advantages are more than counterbalanced by other unpropitious circumstances, which concur to depress agriculture, especially in Baylo Rossia (White Russia). The difference between the western and eastern extremities of this region is very striking. The climate of Moscow may be called the medium, or real Russian climate, and is exceedingly favourable for all agricultural pursuits. Towards Siberia the seasons are much more inclement; while to the westward, beyond the Dneiper and Dwina, they are so mild, that about Grodno and Baylostock plums and pears grow in the open air. Under favourable circumstances, and by means of gradual naturalization to the climate, we meet with fruits even in the northern part of this region, especially apples; but even they require great care, and sometimes the trees are destroyed by the frost. The provinces situated on the Baltic, besides occupying the extreme west, are favoured by the vicinity of the sea; their climate is therefore the mildest of any in this region on similar degrees of latitude. The European part, forming one immense plain but little diversified by hills of any considerable elevation; the local difference of climate is not considerable, and arises chiefly from the forests, bogs, and the nature of the soil.

Agriculture in this region is almost, without exception, conducted on the most primitive and unimproved plan, called the *trekpolnia*, or three-field system, especially in the original Russian provinces, where we scarcely meet with any examples of the improved methods, except here and there by way of trial, or as a kind of rural luxury on the part of the proprietor; while, in the Baltic provinces, considerable progress has been made in introducing a proper rotation of crops, and in general the modern improvements in agriculture. The breeding of cattle has likewise remained in its original imperfect state, without any improvement, and existing only as a kind of indispensable appendage to husbandry. The quantity of forest-land is unfortunately greatly diminishing in this region, except those parts from which wood is not easily conveyed to market. This circumstance seems to threaten the inhabitants with a dearth of that most indispensable article, and the more so, as the southern provinces, where this want is already severely felt, are principally supplied by floated timber from this region. An improved system of forest management is even more necessary than an improved system of agriculture, although the latter would doubtless greatly contribute to introduce the former, for, under proper management, much less meadow and arable land would be necessary to produce a given quantity of corn and hay, and the forests would no longer be destroyed merely for the purpose of procuring a piece of fresh land.

The distinguishing feature of this region is vast and convenient water communication, without which the useful products of the inland districts would scarcely find their way to any market; by their means the single article of tallow is exported to the amount of forty millions of roubles annually.

6. *The Region of Wheat and Fruit.*—It must not be inferred from this appellation that these productions of the soil do not thrive in the last mentioned region, but merely that they are much more abundant here, and that the climate is more genial to their growth. This region may be said to extend to Yekaterinoslav, or to the 48th degree of latitude. Several kinds of grain, as buckwheat, millet, &c., are cultivated here with much greater success than in the last described region. The cultivation of tobacco, although it exhausts the soil, is rapidly spreading, and will eventually become a source of great profit. Hemp is also found to thrive better than in more northern situations, but the chief object of the agriculturist is the breeding of cattle. Studs of horses and sheep-farms exist here as separate establishments; but the breeding of horned cattle is generally connected with husbandry, and on a much larger scale than in the northern provinces. Bee-hives are also a source of no small profit, especially to the peasants. The abundance and cheapness of corn encourage distillation. Spirit is thus the principal and almost only article of fabrication. The greater part of this region was colonized later than the preceding, and the stability of its population in the southern part can only be dated from the conquest

of New Russia and the Crimea. This country may be called the granary of the empire, for it supplies not only Petersburg and the army, but furnishes the principal part of the raw productions (except flax) for exportation. We may therefore conclude, that, with even a more dense population in this fertile district, Russia would have escaped the ravages of famine, which not unfrequently in former times devastated the country. But the more confidently we rely on the fertility of this province for a supply, the more sensibly is a failure in the crops felt. A bad harvest, however, may be considered as a thing of rare occurrence.

In consideration of the vast importance of this region, we must extend our observations to several points connected with its husbandry, namely, the steppes, the population, the variations of the climate, the extent of the villages, and the general method of cultivation. *The steppes* are peculiar to eastern Europe and middle Asia; and are altogether distinct from the American savannahs, which, during the tropical rains, are partially inundated. The natural causes of the destitution of forest on the steppes are, 1*st*, The hardness and tenacity of the earth, which in many places is of such a nature as to prevent the growth of trees without previous digging and breaking up of the soil. 2*d*, The black loam of which they consist is not favourable to the growth of forest. 3*d*, The aridity of the climate and the elevated situation of the steppes, which latter circumstance probably occasions the growth of a number of dwarf fruits, especially apples, which are found on bushes no higher than the grass. 4*th*, The predominance of salt in many parts is not only unfavourable to the growth of trees and grass, but renders the soil unfit for agricultural purposes. The accidental causes consist in the destruction of the woods, of the former existence of which there have been discovered indubitable traces. Such destruction may be accounted for by the nomadic habits of the former inhabitants; by the burning of the steppes in dry seasons, the destruction of the young trees by the cattle, &c. This is the more probable, as, from a very remote period, this country was the abode of various tribes now extinct, who carried on an unceasing predatory warfare against their more settled agricultural neighbours. Forests once thoroughly destroyed seldom, if ever, flourish again unless cultivated by the hand of man; and the country, thus left bare and exposed to every wind, becomes arid, and the climate greatly deteriorated. It must be confessed that there is something so very peculiar in the natural features of the steppes, that the above assigned causes may appear insufficient to account for it; but it would lead us beyond the limits of this dissertation to enter more minutely into the investigation. The steppes, in general, may be divided into the grassy, the heathy, the saline, the sandy, and the stony, not to notice the low grounds covered with reeds. These steppes have considerable influence on the population and husbandry of this sixth region. If, on the one hand, they are favourable to the breeding of cattle; on the other, their destitution of wood, the unfitness of the soil in many parts for farming purposes, the variable nature of the climate, the difficulty of preserving the corn-fields from the inroads of the cattle, and, above all, the scanty supply of water, all concur to retard the adequate increase of the settled population, and to give rise to a wretched method of culture called the *perelog* plan.* The sterile part of the steppes is scarcely less profitable than that which is cultivated, for on it are found the salt lakes, probably the remains of a sea which at some former period covered the country, or perhaps their saline qualities may arise from strata of rock-salt forming their beds, or the qualities of the soil through which the various rivulets run in their course to the lakes. It is not improbable, that, by means of perseverance in an improved system of cultivation, many saline districts may become fertile in the production of useful plants. Some parts may be laid under water to great advantage, especially if they succeed in constructing conduits of fresh water. But the chief advantage derived from the steppes is the means afforded of rearing large flocks of fine-woolled sheep. If we consider the low price of land in Russia, the immense extent of the steppes that furnish good pasturage for sheep, and the cheapness of labour and bread, we may reasonably anticipate the period when Russia will furnish the greater part of Europe with wool, except perhaps the very finest sorts, which it may be more convenient to produce where sheep-breeding is connected with agriculture in its highest state of improvement; and even towards this end the Baltic prov made considerable progress. The variety of climate gion is much greater than in the last described. Tl governments, as Kiev and Podolia, are favoured with seasons, but towards the east, the ungenial effects of tl of Asia are plainly felt, even without entering Siberi more so as we approach the limits of the next, or sever This variation is distinctly visible in the productic earth, it being no longer possible, though on the same latitude, to produce and rear those plants which thr west. Perhaps, in the course of time, when the soil a are properly cultivated, a considerable improvement place in the climate.

---

* This consists in sowing corn on fresh land, until its productive powers are exhausted, and then abandoning it, to seek another spot to cultivate.

With respect to the population of this region, it may ed into the old established Russian inhabitants, who l time immemorial dwelt in the western governments Podolsky, Malo-Rossia, &c., and those that have settle period in Kursk, Saratoff, &c. The original Russia ments are pretty well peopled, according to their exte imperfect system of agriculture which has hitherto pr a system requiring a far greater extent of arable, me forest land than would be necessary under an impro of husbandry; so that, in some parts, a want of lan felt, especially in Little Russia and the government o where the former prosperous condition of the peopl considerably deteriorated by the extraordinary incre consumption of ardent spirits. This deficiency of lan remedied by colonization, which, however, would b with great difficulties; by the encouragement of in manufactories, the effects of which could not be in felt to any considerable extent; or, thirdly, by the in of an improved system of agriculture, which would doubt restore Malo-Rossia, and other districts, to th flourishing condition; for those provinces, which are in Russia as scantily supplied with land, in other pa ope (not to mention England, Belgium, and Up would, with a better system of education, be conside ving more than sufficient for a much greater populati been already observed, that, owing to the great ab unoccupied la[illegible] l [illegible]s in some parts of this region, the *perelog* plan has been a[illegible]; but, in some instances, the three-field method, and in others the rotation of crops, has been introduced. In a country abounding in fertile land, the cultivator naturally prefers tilling fresh ground to continually labouring on an exhausted soil, aware that, in so doing, he secures to his own advantage the first and best productive force of nature to aid his labours. But, with the increase of population, the period will arrive when this custom can no longer be followed. The fields which have been alternately cultivated and abandoned, gradually lose a part of their productive force, the intervals of rest for the land become shorter and shorter, the soil is impoverished, the crops diminish, bad harvests occur more frequently, the common pasturage for cattle is considerably curtailed, and the forests exist only in the memory of the aged. And this is the condition to which many parts of Malo-Rossia, and other anciently settled districts, are reduced at the present day. The introduction of the three-field system, although it be preferable to the *perelog* plan, will not be sufficient to avert the evil consequences that must ensue, and from which nothing but the adoption of a regular rotation of crops, the proper use of manure, the cultivation of potatoes and Indian corn, the sowing of artificial grasses, beet-root, field turnips, &c. can save the inhabitants. It may be objected, and with justice, that the peasants will not be easily made to comprehend a new and improved method of cultivation, and that when they have learned it, they have not the means of adopting it fully; but still of the three alternatives it is the easiest, and in fact requires neither great exertions nor considerable outlay, on their part, while it would have an immense influence in bettering their condition. It is exceedingly desirable that a beginning should be made, and an example set, to show how much more advantageous it would be to devote attention to the improvement of husbandry than to the increase of distillation. It may likewise be objected by some, that the productions of the earth are already so abundant, that it is even now difficult to find a market for them; but, in this case, the fault must be attributed to the cultivators themselves, who think of producing nothing but corn; besides, as the population increases, towns will arise, and the demand will continually increase. It would doubtless be erroneous to suppose that, in the fifth region, there are no places sufficiently populous to require a proper rotation of crops, instead of the three-field method: in fact, it would be of immense advantage in every case, except only in those districts where there are still considerable tracts of new uncultivated land.

7. *The Region of Maize and the Vine.*—Although we have fixed upon the vine and Indian corn as characteristic productions of this region, it must be remembered that it produces also all those common to the last described. The vine, as is well known, thrives only in certain climates and situations; and Indian corn is not to be considered as an exclusive product, but rather as a distinguishing feature. This region includes Bessarabia, the New Russia, the territory of the Don Cossacks, the government of Astrachan, and the Caucasus. The southern part of Siberia, from the peculiar nature of the climate, can scarcely be said to form any portion of it. The greater part of the above mentioned governments and districts consists of steppes, partially used as pasturage, and in part unproductive. The Crimea (at least the southern part of it), belongs rather to the next region. The hilly parts of Bessarabia are fruitful and well supplied with wood. The low lands are steppes, which, towards the Danube, are covered with reeds, and the air unwholesome. On the banks of some rivers, and in various other parts, the vine may be cultivated to advantage. The government of Cherson presents a vast plain intersected by deep narrow ravines or dells; the soil is hard, and but little suited to the growth of trees, without the assistance of art, exposed to frequent droughts, and consequently to bad harvests; besides which it is at times (as well as other parts of the seventh region), subject to the ravages of the locust. The government of Yekaterinoslav suffers less than that of Cherson; but eastward towards the Donetzky ridge, near Bakhmut and Slavianoserbsk, droughts are more frequent. The northern part of the government consists of steppes fit for pasturage, and abounding in salt; the southern part enjoys a most genial climate, especially along the shore, where the sea has considerable influence on the atmosphere, but this tract belongs properly to the eighth region. Not only the vine and other delicate fruits

trees grow here in perfection, but also the olive, the caper, &c. which have been planted, thrive, and will doubtless, in the course of time, be cultivated on a large scale. The southern parts of the government of Voronesh are steppes, but capable of cultivation. The territory of the Don Cossacks is also steppe, towards the south-east, but fit for all the purposes of husbandry. Coal is found in the Donetzky ridge, as well as mines of lead and iron. Other parts are more or less suitable for the purposes of agriculture and the growth of the vine. The government of Astracan has, in many parts, a sandy soil, affording scanty pasturage for the cattle, and the vine is cultivated in the Asiatic manner, by irrigation, which renders its fruit unfit for wine. The northern part of the Caucasus is principally sandy, interspersed with saline tracts and rivulets. Breeding of cattle is carried on to great advantage by the nomadic tribes which inhabit it. The southern parts towards the rivers Terek and Kuban are good for tillage, especially towards the west. In the environs of Kizliar, a kind of wine is made, that is chiefly used in the distilling of brandy, and no doubt there are many other situations where the vine would thrive. The territory belonging to the Cossacks of the Black Sea, consists partly of very low grounds, the rest resembles the western part of the Caucasian government. Population is but thinly scattered in this region, and the attempts at agriculture are all of recent date. A considerable portion of the population is of Asiatic origin, and not a few of the tribes still retain their nomadic habits. The other inhabitants of the country consist of Russians, Moldavians, Bulgarians, Greeks, and German colonists, the latter including the Menonists, celebrated for their superior husbandry. Gardening, as a speculation, is carried on to a considerable extent, but the numerous flocks of Merino sheep form the principal source of wealth, and they may yet be augmented to an almost incalculable extent. We may even hope to see large flocks of these useful animals, bred in Siberia, and the society formed for the purpose of introducing them is deserving of every encouragement. New activity may be instilled into this undertaking, by grants of crown lands for the purpose of establishing sheep-farms. The nomadic tribes can scarcely participate in the advantages resulting from the introduction of this breed, as the sheep require proper shelter and food during the inclemency of the winter months, and it would be contrary to the improvident habits of these wandering people to lay up a stock of winter food.

The principal defect of this region is the almost total absence of forests, and the great difficulty of rearing trees. Thus for want of wood the inhabitants are obliged to burn reeds, *buyan* *, straw, and *kizyak* †; but the employment of the two last mentioned articles is contrary to the rules of good husbandry, although it can hardly be said that the time is arrived for the introduction of an improved system into these provinces. It would perhaps be well, in the first place, to turn our attention to the improvement in the breed of sheep, to the laying out of gardens and vineyards, and to the cultivation of Indian corn and exportable fruits; although the sowing of artificial grasses would prove of vast advantage to the breeders of cattle, as well as facilitate the future labours of the agriculturist. Equally important is the planting of trees, not only for the sake of a supply of building-timber and fuel, but also for the improvement of the climate. In the mean time, the inhabitants must be content with their present kinds of fuel, unless turf can be discovered, or the coal of the Donetzky ridge be brought into more general use. The means that may be adopted to supply the present deficiency of wood are the following, 1. To plant the larch and other quick growing trees in spots where the soil is suitable, not too elevated, and sheltered from the strong blasts which sweep the plain. Other plantations may be reared with greater facility, under shelter of the first. 2. The gradual plantation of suitable trees near the farm-houses and villages, round the fields, along the roads, and especially in the ravines, where even now bushes make their appearance. By these and similar means, in the course of time, a considerable quantity of wood may be obtained; if not large timber, at least useful materials for a variety of domestic purposes. The branches of the willow, the poplar, and other quick growing trees may be periodically clipped, and together with the annual clearings of the gardens and vineyards, would furnish a considerable quantity of fuel: many parts of Europe are supplied by similar means. Unfortunately man but little inclined to embark in undertakings which only present a distant prospect of reward; especially in those countries where he has hitherto been accustomed to cultivate the soil in the most simple and unimproved manner. Experience has shewn that it is difficult at first to induce him to bestow his care even on the cultivation of fruit-trees, much less inclination would he have to plant those of the forest. We must, however, hope that some good examples, and the expectation of reaping at least the first fruits of their labours, will overcome these scruples, and that the desert will be made to flourish by the hand of industry and perseverance.

---

* The high grass of the steppes.

† Dried cow-dung.

8. *The Region of the Olive Tree, the Silk Worm, and the Sugar-cane.*—This region includes the provinces beyond the Caucasus (Zakaukasky), but the climate, owing to the mountainous nature of the country, is exceedingly various, as may be seen by the diversity in the productions of the soil. The plants peculiar to hot climates grow in the valleys, while the hills are covered with corn and pasturage for cattle. The soil is also of various kinds, and towards the east there are extensive steppes. The local climates of this region may be divided in the following manner: first, The summits of the mountains always covered with snow; then the beginning of vegetation, where nothing but pasturage for cattle is found; then follow the corn-fields; below them the vine flourishes, and we meet with the mulberry and other fruit trees; while still lower, in the vallies, particularly in the Persian provinces, grow cotton, rice, and other southern productions, which require artificial irrigation, an operation familiar to the inhabitants of Asia. The olive thrives chiefly in the western part, and only in those spots peculiarly suitable to its culture. The sugar-cane, that important colonial production, has been planted, and is spreading in some of the low and rich lands about Kura; but we can scarcely expect that this branch of industry should arrive at any considerable extent or degree of perfection. This succession of climates, according to altitude, presents a curious resemblance to the climates as they follow each other according to latitude. The forest region is the only one that is wanting in the Zakaukazian mountains. The country beyond the Caucasus produces spontaneously several objects

of great value, as a peculiar kind of cochineal, assafœtida, &c., which may become the sources of great ultimate advantage. The most important, however, of the productions of this region, is doubtless silk, which may be said to be indigenous to the country, and no pains should be spared to bring this branch of industry to the greatest possible degree of perfection. The excess of the produce, after the home consumption is supplied, might, by means of the Danube, be transported at once into the heart of Europe. After silk, perhaps the olive would be the most advantageous object, and most deserving the attention of the cultivator, not forgetting wine, especially for home consumption. There is another plant deserving peculiar notice, the Sesamum Orientale, which grows abundantly in Egypt, and in the environs of Constantinople. The oil expressed from its seeds is of an excellent quality, not inferior to that of Provence. The growth of cotton would also be of great importance if it could be carried on to any great extent; the same may be observed of rice, but they are both, when extensively cultivated, injurious to the climate. In the course of time indigo may be produced, but of this, as of other tropical productions, nothing positive can be affirmed. In the first place, it will be well to bestow our chief attention on the culture of those plants that are indigenous to the soil and climate, and on the encouragement of agriculture in general, and that there may be an abundant supply of provisions for the inhabitants. Such is the variety of climate, and such is the diversity of productions in this vast empire, whose resources may indeed be said to be inexhaustible, incalculable.

---

## ON THE DANGER OF OVER-DRAINING MOSS.

In No. 31. of this Journal, published December 1835, was inserted under the head of Miscellaneous Notices, page 482, a very interesting communication on moss improvements by Mr A. Blackadder. In that instructive essay there is an assertion, a very important one, in which I do not accord; and coming, as it does, from a gentleman versed in such matters, it is calculated to mislead practitioners, if not contradicted. I therefore hope I may be excused in attempting a comment on the subject.

The assertion to which I allude is expressed in page 484, line twenty-six. I quote the line, as the print is close, and the sentence short, and might escape notice: "There is no danger of over-drying moss by draining." I admit that saying is correct in a general sense; but practice has furnished many exceptions to that general rule, some of which have come under my own observation. I select two of those, much in point, and will give them in detail.

On my riding over a gentleman's estate in Staffordshire many years ago, my attention was particularly directed to a moss which had been drained several years previously. It was then in a very unprofitable state, and was still deteriorating, principally *owing to its having been over-drained.* The moss was situate in a basin or valley surrounded by hills, the soil of which was sandy gravel, and the soil on which the peat was recumbent was of similar texture. In the draining operation a wide and deep ditch had been cut quite round the outside of the moss, at a great and unnecessary expense. That excavation, for so it might be termed, had effectually cut off the springs issuing from the bottoms of the hills, and a considerable body of water was collected and flowing current at the bottom of the immense ditch. A large centre-drain, with tributary cross-drains, had also been cut through the moss. Those produced but little water at the time I viewed them, the former supply having been cut off by the exterior drain.

The sand and gravel thrown out of the drain had been spread over the moss, and the greater part was under arable culture. I was told it had also been well cultivated, limed, and dunged; but I must say, I never saw land of any description producing more miserable-looking crops of oats, barley, buckwheat, turnips, and potatoes. The only vegetable looking promising was a small patch of rape. On one part the old turf had been pared and burned after the draining, but even there the crops were alike deficient. All the ploughed land was light and puffy, and the horses' feet sank deep into it. The mossy substance was fast decomposing and evaporating, and I was told the surface had then sunk four feet in level from the time of its being drained. I had no reason to misdoubt that statement, indeed it was evident that, in a very few more years, a small residue only of the moss would remain, and the sandy soil at bottom be left without cover; that is, supposing the arable culture to be continued, and even if attempted to be laid down to pasture, grass seeds were not likely to take upon such loose puffy ground. As to the part not ploughed, it was in a little, and but a little, better state. It had also sunk greatly in level, and sand and gravel from the ditches had been spread over it. The herbage it produced was thin, stunted, and poor, principally brown bents and Yorkshire soft grass, and these the stock did not eat. I observed, that had the lime and dung which had been *thrown away* upon the arable moss been applied to the pasture, and proper grass seeds sown, it would have tended to a better purpose; but even then a good pasture could not have been obtained upon that *over-drained moss*. The great expense incurred by the owner was thus misapplied; in fact, the occupiers told me the moss was far more valuable to them before the draining was commenced. I never saw a more complete failure in any similar undertaking.

I also viewed another moss upon the same estate, and only a short distance from the former,—it had been managed in a more rational manner. It was only partially drained by means of ditches cut across it, but not to the bottom of the peat; gravel and lime had been spread over the surface, and the turf had not been broken by ploughing; it produced pretty good herbage close eaten by stock: I observed white clover, fiorin, and many good meadow grasses. That land was rented at 20s. per acre. The turf was thick and tough, and, in riding over it, the horses' feet left no impression, though it sounded hollow. It was dry weather at the time of my visit; the land would probably be poachy in winter, but the price at which it was let—and the tenants did not complain—was the true test of its value. I had no reason to believe there was much difference in the relative value of those two pieces of moss land, acre for acre, previous to draining; but certainly, when I saw them, the partially drained was better worth 20s. the acre, than the thorough drained at a nominal rent.

Hence, judging on the two cases I have here stated, and of others similar in result which have come under my observation, I think I am fully justified in drawing a conclusion, that *there is danger* in over-drying moss by draining, especially where the soil on which the moss is incumbent is of an inferior description.

F. B.

## THOUGHTS ON DRAINING AS THE SPEEDIEST MEANS OF FERTILIZING THE SOIL.

It appears, then, from the observations which we made on the extension of draining in the last Number, that much of the arable land, and the greater proportion of the natural pasture, in Scotland, require extensive and thorough draining. Could this truth be successfully pressed to conviction on the minds of proprietors and farmers, we have no doubt that thorough draining would be generally applied as a remedy without delay; for the experience which discovers the increase of produce by draining, becomes at the same time satisfied of its profitableness. That this conviction is really spreading apace, may be inferred from the great extension of draining which has been effected within these few years, particularly the last ten. What have been the immediate causes which have led to this improved practice, it is not our present purpose to inquire—that will form a subject for future investigation—our present purpose only being to state the fact as it exists. Whatever these causes may have been, this is their cheering result, that, amidst unprecedented difficulties, our agriculturists, by their own elastic energies, still continue their efforts to fertilize the soil. This result, undeniable as it is cheering, strongly urges us to prosecute the important subject which occupied our "thoughts" in the last number, which, we have the satisfaction of learning from various quarters, has excited no inconsiderable degree of attention, that our practical friends may still farther be induced to pursue the means which have produced so favourable a result.

It is the practice of physicians, that whenever a disease is known, a remedy is immediately applied to effect its cure. It is desirable that a similar rule of practice were adopted by farmers, as well in regard to the soil as to live-stock. It is desirable that where the disease of a wet subsoil is observed, draining should be immediately applied to effect a cure; and as a disease is only known by its symptoms, that farmers would endeavour to acquire the symptoms of a wet subsoil, in order to be qualified to apply the infallible remedy of draining. As a practitioner, the farmer has greatly the advantage of the physician, for draining is a *specific* against all the injurious effects of a wet subsoil; whereas the most skilful application of medicine by the physician may be unavailing towards the cure of the disease. There being, therefore, the assurance of success attendant on draining, it is remarkable, that during the progressive improvement of agriculture in Scotland, one farm should now be left to be drained. Draining is no doubt a laborious, and expensive, and slow operation, but as, when properly executed, it invariably insures its own reward, it is remarkable, we repeat, that a single farm, instead of whole parishes, should now require it. Want of capital may deter some from undertaking it; but is the condition of the farmer so reduced, that credit cannot be obtained for him to prosecute even a safe and permanent undertaking, or his landlord so lost to a sense of his duty, as to refuse his support to a measure which cannot fail to promote his interest in common with that of his tenants? We cannot believe it. We rather believe when the will prompts, a way will soon be discovered by the perceptive faculty. We fear that apathy enervates the hand of one, and ignorance lulls the mind in conceit of another class of farmers. The allegation, though severe, appeals for its justification to the actual condition of small farms, which employ from one horse to two pairs of horses. Such farms are generally very low in the scale of condition, the ploughing is being seldom thoroughly executed; the horses being stinted of corn are kept in poor condition, and the ploughman, if he is not the farmer himself or his son, is a man who is hired, not because he is a first-rate holder of the plough and guide of horses, but because he has accepted the lowest rate of wages in the market. Having been hired on the lowest terms, he thinks his lowest rate of service a sufficient equivalent for them, and his time misspent in grooming a pair of horses which he considers only fit for the tan-yard; and yet he would any night cheerfully spend much more time than would be required to groom his horses properly, in the smithy, the news-room of "country politicians," or in the bothie of a neighbouring farm. The fences, if any on such farms, are generally neglected, and only repaired when necessity compels; and a short stump of a drain is at length made, in a part of a field, only after it has been long seen that water stands on it in a pool, the horses sink in it, or it will yield [illegible] produce. The roads and spaces about the houses and steading are always rough and dirty, and devoid of comfort to man and beast. The occupants of such farms have been stewards, or foreman-ploughmen, on large farms, who have saved a little money. They are not deficient in skill of farming; on the contrary, it is their skill in their former trusts which entitled them to ask and obtain such wages as enabled them to save money to take farms; but unfortunately for the continued exhibition of their skill, anxiety to become their own masters, and be the masters of others, before old age overtakes them, induces them to engage in farming before they have accumulated a sufficient capital to furnish their houses in the style of farmers, and to stock and carry on until the first crop is reaped, much less to improve their farms. The sons of such occupants seldom follow their fathers' profession. Witnessing a continual struggle for existence, they are glad to escape a thraldom which they have long experienced. Of a truth, there is no class of the agricultural population more to be pitied in their existent condition than this.

The large farmer can obtain credit, and can live above want, upon the small profit derived from large quantities of produce passing through his hands; the labourer receives his weekly wages, or his earnings by piece-work, which, if he keep his health, is an adequate income, to secure to him and his family the necessaries at least, if not the luxuries of life; and the ploughman is insured his yearly income, who, after finishing his day's work, in a decent manner, can retire to his happy dwelling, relieved from care at least, if not from toil; but the class of small farmers of which we are speaking, have none of these resources to support them. All the produce which can be spared to take to market is but little, certainly not more than is requisite to settle the demands of rent and expenses, and not sufficient in quantity to leave a profit. Raised by penurious management, the produce of their farms is much less than it might be, and the quality of that produce is inferior. Lowly supported as they and their families are, and slovenly as the land is worked, the requisite live-stock which is kept on them bears a large proportion to the extent and produce of their farms. Theirs is a life of continual care and anxiety.

Another class of small farmers is widely different in condition from the one described. Having occupied land as liferenters, or on leases of long duration, at small rents, they have generally accumulated fortunes, which are always selfishly expended on stocking large farms for their sons, or lent out at interest to landed proprietors. As many of the sons of this class become farmers as the father has means to stock farms. In character this is a respectable class of farmers, and they form the connecting link between the large farmer and the ploughman. But having been bred up in the old school of farming, or succeeding to old-fashioned sires, their ideas become as contracted by constant residence, as their small farms; and the excessive prudence of this class forms as great a bane to the agricultural improvement of the country as the one formerly described. They will not spend a shilling until they can "clearly see their way" of regaining it with advantage. They will remain as they are, rather than "fly to ills they know not of." As to mending farm-roads, running fences, enlarging steadings, or draining fields, except to obliterate a pool of water, these are outlays of money which they conceive can never be recovered, and which ought only to be incurred by landlords, although in most cases they are richer than their landlords; and, in all cases, comparatively, can command more ready money than any landlord. Their horses and cows are in better condition because this class of farmers are not so fond of overstocking as the other. The domestic comforts of the farm-house, though frugal, are also unexceptionable.

It is impossible to state what extent of land the small farmers in Scotland actually occupy; but what with them and the large farmers who neglect draining, the greater area is certainly occupied with the non-improving class of farmers. But, comparatively, there are fewer small farmers in Scotland than in England or Ireland. Is it fair to conclude, then, that the agricultural improvement of Scotland is greater, comparatively, than that of England or Ireland, just *because* there are more large farmers in it, since it is only by the large and mostly arable farmers that improvements have been prosecuted in that country? It is not evident at first sight what inducement prompts a large farmer to improve his farm which a small has not. Both apparently have scope for improvement according to their means. But a large farm does possess advantages for improvement which a small one cannot have. The *materiel* for labour is comparatively smaller, and is more fully employed all the year round, on a large farm; because a large farm is most likely composed of different kinds of soils, the labouring of which is so accommodated to the different states of the weather, as to economise, and not lose time. Besides, a very small profit on each portion of the large quantity of produce of grain and live-stock sent to market from a large farm, will generally leave a surplus over the expenditure of rent and expenses; and economy in labour, at the same time, reducing the expenditure, that surplus is increased, and, in such cases, is almost always disbursed in improvements, such as draining, liming, &c. Such advantages can never be derived from a small farm; but they are the chief resources which supply the means of improvement, without which farming could not repay its own cost. In short, a large farm is always a cheaper bargain than a small.

Now we wish to avoid the imputation of promulgating the heterodox doctrine, that small farms cannot be improved; on the contrary, we know they may be effectually improved. We know many instances of their improvement in Scotland, and the fact is in proof at this moment in Ireland through Mr Blacker's exertions. But after what we have stated of the mode of working them, we maintain they cannot be improved but at comparatively greater cost than large farms. The possessors of large farms will thereby always have the advantage over small farmers in the markets, because their disposable produce being larger, at a smaller cost, their profits will be greater at the same prices. Nevertheless, let the small farmers improve the stamina of the soil by draining, and they will in due time discover that the same *materiel* of labour which they now employ, notwithstanding that it will always be proportionably great on small farms, will then insure a larger return of produce. Increased produce will insure a profit, and a profit, however small, will form a disposable fund for further improvements, will thus give a command of ready money, and obviate most, if not all the evils, at present arising from small farms.

It is clear, then, from our first paper, that draining might be much extended in Scotland, and it appears from what has been stated in this, that one great bar to its extension is the negligent farming on small farms. It now remains to be shewn that the most speedy means which can be adopted for *fertilis ing* the soil, is the extension of thorough draining. We sa *thorough* draining, meaning thereby the thorough drying of th soil, whatever may be the mode adopted for accomplishing thi object. That being the object which it is wished to be acquired the means used for its acquisition should be adapted to circumstances. There appear to be only two methods of thoroughl drying the soil. One is what is called Elkington's method, whic searches after, and detects the seats of large quantities of wate which are naturally pent up among deep, impervious, and hidde strata. The water, in finding its way to the day, greatly injures the soil. Unless these springs are removed at their sources it will otherwise be impossible to render the soil dry. Thi method of eradicatory draining has long been practised, and it beneficial effects may be observed in every *arable* district wher no large springs are now seen to injure the soil, although ver much good has yet to be effected by this method of drying the so in every *pastoral* district. This method has also been very successfully applied to the draining of bogs; indeed, it is the princ pal means of drying them. But by far the greatest injury accrue to the soil—the great arena of agriculture—from the stagnation c water on its surface, poured from the atmosphere in rain, snow, hai and dew, or derived from rivers, in inundations and percolation through pervious strata. The attempt to remove this leprou evil may be said to be only begun in Scotland. It is strang that the remedy should have been so long of being suggested! S long as the more obvious and apparent evils of springs attracte the attention of the husbandman, the subterraneous plottings a stagnant water passed unobserved. Now its baneful effects ar deprecated on all hands, and draining is universally acknowledge to be the only remedy which can remove them. Not that th acknowledged remedy has yet been universally applied; but serious acknowledgment of an evil will in time find an adequat remedy for its removal. But the Elkington method of drainin is not the most advisable remedy for the removal of stagna water. Such a remedy, like the opening of a large bloodve might more quickly draw off an arterial hemorrhage than other, but it would not remove a local inflammation. The topical application of leeches is better suited to heal an irritated surface. So another kind of draining which has been of late years adopted in this country, is better suited than Elkington's to effectually remove stagnant water from the soil. This kind has not yet received an appropriate designation. It has been called wedge, tile, frequent, and furrow draining, none of which conveys the idea of its entire mode of action. Wedge-draining is so termed, because the drain is made so narrow at the bottom that a portion of the substance used to fill it is wedged down to form a conduit under it for the current of water to pass through. But this draining is only strictly applicable to strong clay soils. Tile-draining can only be properly called so when tiles are used, which should never be where stones can be obtained in sufficient abundance. Frequent draining is so termed, because it presents so many drains as to afford *frequent* opportunities for stagnant water to escape; but as wedge and tile draining may both afford equal facilities, and the actual frequency of the drains depending entirely on the nature of the subsoil, the term seems not very appropriate. Furrow-draining is so called, only because it is formed in the furrows; but the furrows may not always occupy the best position for thoroughly drying the land. We apprehend that *thorough* draining is not only the best descriptive term for that drain which removes stagnant water, but it also affirms what the drain really effects—the thorough drying of the soil. An appropriate designation for any term of rural improvement is a matter of importance, for country people are apt to prejudge of the nature and utility of any improvement before they have seen it, from the idea which its designation suggests. For example, let *tile*-draining be recommended to a farmer who had never seen tiles used for that purpose, and he will immediately ask, from the obvious sense of the term, if tiles are better than stones for draining. Or let *furrow*-draining be recommended to him, and he will tell you that his land is not wet enough to require a drain in every furrow. On the other hand, let *thorough* draining be recommended to him, and he would understand it at once, and his conception of it would be correct, that his land would be thoroughly drained by it.

Now let us inquire what thorough draining is, and how it operates. It may be best described by what it is not. It is *not* tile-draining, for no tiles may be used in its structure. It is *not* furrow-draining, for it may be improper to run a drain in any furrow. It is *not* wedge-draining, for the drains may not be best cut in the wedge-shape, nor may any wedge be used in them. It is *not* frequent draining, for some kinds of subsoils can be dried by placing the drains at a considerable distance from each other. And it is *not* the Elkington method, for it may not require deep drains; and it is not of a ramified pattern, because it is not intended to cut off the sources of springs. Thorough draining may therefore be defined as *that kind which removes surface water from subsoils, by placing shallow, though substantially constructed drains in parallel lines, at such distances and in such a position, as thoroughly to dry the soil without injury to their structure.* According to the spirit of this definition, thorough draining admits of drains being filled with tiles, stones, or other appropriate materials, provided they are substantially constructed; it admits forms of drains of any shape, whether wedge-shaped or otherwise, provided they are placed in parallel lines and not cut too deep; it admits the placing of drains in any position, whether up and down the slope, or along its face in a diagonal direction, provided the inclination given prevents the destruction of their structure by the force of running water; and it admits the running of drains in any place, and at any distance from each other, provided they be so near to one another that the water can have easy access to them from every direction. Thorough draining acts as an absorbent like a sponge, presenting in all directions numerous channels to imbibe the superabundant moisture. No sooner does rain or melted snow percolate through the ploughed soil, than thorough draining offers a safe conductor to receive and convey it away.

But another indispensable inquiry remains to be instituted before we can clearly arrive at the final conclusion, that draining is the speediest means of fertilizing the soil. We have to ascertain that state of the soil in which draining shews its greatest efficacy as a fertilizer of soil. Most people accustomed to field labour imagine that they can easily indicate the state of the soil which requires draining, and the exact places in which drains should be formed. Many egregious mistakes have thus been committed in draining, and particularly in thorough draining. Any one is competent to observe where a spring bursts out to the day, and where the soil is partially dark coloured when ploughed, and where it is in a pulpy state at the wettest place; and any one can detect the well-eye bursting out its waters near the bottom of a bank of natural pasture, surrounded with a verdant margin, and originating a train of those plants which luxuriate most vigorously in spring water, such as the fiorin, some species of poa, and the water-cress; but a palpable error would be committed, were any one ignorant of their nature, to attempt to cut off the sources of such springs. To accomplish that effectually requires a previous knowledge of the nature of the alluvial and harder rocks, among which springs generally originate, and especially a competent knowledge of those in the particular locality. Although springs clearly indicate an obvious necessity for draining, which, if effectually executed, will always recompense the cost, stagnant water under arable soil is not so easily detected. The evidence of its existence is not so much pathognomonic as symptomatic, to use still the phraseology of medicine. The crops commonly grown are most correctly symptomatic of stagnant water. Through its baneful influence the straw of white crops is short, small, fine, soft, easily broken from shortness, not brittleness of fibre, and stained as if with rain. The grain is small, and although at times well enough filled, has always a puny and palish appearance. Cutting grass is also small, fine, not long, and much inclined to abundance of flowers, and of course to seed, which are both small. The hay is always light for its bulk. Pasture grass is short, stiff, not thick set nor fine, and of a bluish grass green colour. It does not fatten live-stock well, particularly in tallow. Sheep thrive worse than cattle on it, their wool being light, and to appearance dead. Little milk and butter are derived from it. Turnips are small, hard, and fibrous, and their leaves grow nearly erect, and are often margined with red. Potatoes are small in the stem and short, the tubers being small, watery when boiled, and the crop never very abundant. The symptoms from the land itself are, that it is apt to get foul with couch-grass, which, when hand-picked, cannot be gathered free from soil, but is easily broken, fine, and very adhesive to balls of earth. This weed renders the ploughing and harrowing of such land, particularly the harrowing, very tedious, and when both operations are repeated till the soil is free of it, the soil by that time becomes too much pulverised and deaf. The furrow slices of land rendered thus deaf cannot stand up on their own feet, but soon clap down, become obliterated, and assume a wasted and hungry appearance. The dead roots of stubble, when ploughed after harvest, do not adhere firmly to the soil, but are easily rubbed out by the coulter and mould-board, and carried forward in bundles before the coulter. The symptoms attendant on the application of extraneous matter to land in that state are, that farm-yard dung, whether fermented or fresh, does not quickly incorporate with the soil. It remains in an inert state, lumpy, and moulders away into a blackened mass. Bone-dust does not quickly incorporate with the land, therefore does not quickly decompose in it, nor does it ever impart that greasiness to the soil which is its valuable characteristic as a manure. Lime does not quickly mix with it, losing its caustic properties, and soon becoming like mortar, and of course *effete.* Hedges which are planted in it become stinted in growth, and covered with moss, and most of the kinds of forest trees are soon in the same plight. Plants indicative of dry soil never grow in it, but give place to those which thrive in moist earth, such as the horse-tail, dead-nettle, sprats, some species of the rush, thistle, &c. Besides these obvious symptoms, there are others more latent, which are only obvious after having been detected ; such as the ground when felt in walking over or being trodden on. It is difficult to describe this sense of feeling by words. The ground feels less firm, more likely to slip under the foot by the arable portion sinking into or sliding upon the subsoil, and in some cases it will sound hollow on being jumped on. In such suspicious circumstances we have frequently seen drains release large quantities of stagnant water which had lain concealed and encased among beds of impervious clay. In short, when we come to examine thus minutely into the state of land, we will find a very small portion of it indeed that can naturally claim exemption from draining.

In considering this enumeration of evils, and the catalogue is a long one, it may be observed that most, if not all of them, are symptomatic of bad land, as well as that under the influence of stagnant surface water. The observation is quite correct. But it should be borne in mind that stagnant water turns good land into bad, and that bad land is so chiefly because it is permitted to remain injured by stagnant water. It is true that all sorts of land are not alike in their nature, nor alike in quality,—some are naturally good, and some naturally bad,—but in all the natural classes of soils which are easily affected by draining, and they are the most numerous, the good of them are good, because they are naturally drained, being composed of, and resting on pervious materials; and the bad are bad, because they rest on retentive subsoils; and the more retentive subsoils are, the worse the soils which rest upon them. Soils, therefore, are not naturally so dissimilar in quality for the purposes of husbandry, as that they are rendered so by being naturally placed on dissimilar subsoils. Land, if of considerable depth, may, however, be very good although it rest on a retentive subsoil; but the good soil below the reach of the plough forms, in that case, the subsoil, and not the retentive matter, which may be at a considerable distance below it. The best natural soil would become bad if placed on a retentive subsoil. It is the nature of the subsoil, therefore, which stamps the quality on the soil for the purposes of agriculture, for the natural quality of soil is, in all events, much enhanced by the art of husbandry. Pure carse clays may seem to form an exception to these remarks, but attention to their nature, as they are really affected by stagnant water, will shew that even they form no exception. Pure carse clay soils are generally formed in deep beds or in masses several feet in thickness, the pure clay itself forming the subsoil to the pure clay which is subjected to the plough. When water finds its way through arable soil, it descends to the subsoil, which, when impervious, it cannot penetrate, but slides down both sides of the ridges to the open furrows. But the arable part of clay soil can only be penetrated by water immediately after it has been ploughed; for soon after ploughing it consolidates, and the water then can only run along the *impervious surface* to the furrows; so that pure clay soils can never be said to stand over stagnant water: and should drains be placed in the furrows and open cuts formed in the hollows elsewhere on the surface, no surface water could long remain on them. Could a rounded form be given to the subsoil of the ridge upon which the sole of the plough moves, and that subsoil rendered smooth by the lower edge of the furrow slice, being cut clean with the near approximation of the points of the coulter and sock, the surface water that at any time might reach the subsoil, would pass easily off to the drains in the furrows.

Having contemplated the evils arising from water becoming stagnant under arable soil, let us now contemplate the reverse of the picture, the pleasing and valuable effects of draining. The existence of moisture being most easily known by its effects on the crops which are commonly grown on the fields, the benefits of draining are also first exhibited by them. The straw of white crops on thoroughly drained land shoots up strongly from a vigorous braird, is thick, long, and, at the same time, so stiff, that the crop is not easily lodged. The grain is plump, large, bright coloured, and thin skinned. The crop ripens uniformly, is bulky and prolific, is more quickly won for stacking after being cut, is more easily thrashed out, winnowed, and cleaned, and produces fewer small and light grains. The straw, also, makes better fodder for live-stock. Cutting clovers become strong, rank, long, juicy, and the flowers, though fewer, very large and bright of colour. The hay is heavy for its bulk. Pasture grass stools out in every direction, covering the earth with a thick mass of rank vegetation, which produces fat and milk of the finest quality. Turnips get large, plump as if fully grown, juicy, with the skin smooth and oily. Potatoes are long, and strong in the stem, with tubers large, with skins easily peeled off, and mealy when boiled. Stock of every kind thrive, become gentle tempered, and fatten easily, particularly sheep, which improve both in mutton and wool. Land is less occupied with weeds, the luxuriance of the sown crops choking their growth. Summer fallow is then easily cleaned, when practised on strong soils, and much less work is required to put the land in proper trim for the manure and seed. All manures quickly incorporate with soil when drained. These all are symptoms of good land, observed on the same soil which formerly exhibited symptoms of bad; thus proving that by draining is derived the same results from bad land (that is, from the natural surface, whatever may be its component parts, when it rests on a subsoil naturally so retentive as to detain the surface water which reaches it until it stagnates), that are derived from good (that is, from the natural surface, whatever may be its component parts, when it rests on a subsoil naturally pervious to surface water). Can facts stronger than these be adduced to recommend the adoption of draining? Can statements stronger than these be produced on any subject to make out a clearer case in its favour, than have been now produced in favour of draining as a fertilizer of the soil? To hesitate, therefore, to drain land, is willingly to hesitate to confer benefits on one's self. None need urge the plea of inability from want of capital to undertake even the expensive operation of draining, since its effects are immediate as well as compensative. Every one can do a little to begin with; and every year thereafter, the draining, however small, will increase the means proportionately to extend similar operations in future. Besides, let a farmer think of the happiness which he is daily storing up for himself, in the contemplation of the enlargement of his means, from the judicious application of his skill and industry on that soil which is the source of his existence. At any rate, should the experiment fail, and disappoint his fondest hopes, it affords greater satisfaction to the mind, and confers a higher honour on the conduct, to yield to the burdens incurred by improvements, than to sink under the obloquy of indolence, to encounter the charge of ignorance, or to suffer the imputation of revenge even against the real, and it may have only been, the supposed, unkindness of a landlord. If time permit by the lease, let him rather exercise a truer independence of mind, and shew it by improving his land by draining, which will, in return, as surely as the effect follows the cause, improve his own circumstances, and place him in a condition of independence, above the request of a favour from his landlord. And should he have done all that industry and skill can perform, and still continue to struggle with pecuniary hardships, he then places himself on the high vantage-ground, from which he will be able with effect to *demand* the alleviation of his condition. Let him depend upon it, that landlord must be an exception to his class, who would long withstand the just claims of unrewarded industry and skill.

But it is not to be understood, that draining is the only fertilizer of the soil. Ploughing, dung, bone-dust, lime, are all fertilizers of the soil; but without draining, as the precursor and the foundation, all "these appliances and means to boot," will encounter many difficulties, and raise but a flimsy superstructure. The action of all these "appliances" on the soil after it is drained, would form an interesting inquiry for another paper.

The best sites and positions for drains should now occupy our attention; but the subject is attended with so many practical difficulties, that it is impossible to explain them in writing. Many simple cases, it is true, both in spring and stagnant water-draining, may occur in every man's practice, in which he may with ease judiciously apply the Elkington and thorough-draining systems; but in most cases neither of them is easily applied, particularly in the less obvious cases of thorough draining. It is not sufficient to run a slim cut in every furrow, and fill it up with a few tiles, and hurry back the earth upon them. The furrows may not lie in the proper direction, and they may have too great a declination to drain the land thoroughly. It is *effectual* draining that is required, and not the mere cutting up of furrows. This constitutes an important distinction. When a farmer is not well acquainted with this distinction, and has a considerable quantity of land to drain, on which he wishes to pursue the thorough system, we would recommend him to employ a professional drainer to lay out the drains for him in the first instance. The amount of fees to the professional drainer will be but trifling, compared to the advantages for ever to be derived from his directions. The few pounds of outlay in this way will be lost among the many which they will surely and quickly return. Knowledge thus acquired from fixed principles, which have been deduced from experience, will enable the farmer himself to assume with confidence the character of drainer; but without the guidance of this knowledge he will miss his aim, and whilst he is thus injuring his land, he will be draining his pockets.

But although it is impossible to indicate in writing, the exact positions of drains on any class of soils, yet a few hints on those, which admit of the greatest application of draining may not be unserviceable to the young farmer. Correctly speaking, pure, homogeneous clays cannot be *drained*, draining literally signifying a percolation of water through a pervious medium. They only mode of keeping clay soils dry, is by the removal of surface-water, which may be completely effected by open cuts on the ground at the hollowest places, in conjunction with small drains in the furrows between the ridges. Hitherto open cuts only have been used on clay land, but now-a-days drains in the furrows are strongly recommended to co-operate with them, and the recommendation, when attended to, has been accompanied with as much success as the inordinate breadth of ridges will admit of. Ridges of clay soils are generally formed broad, and often crooked,—broad, because the land had to be many times gathered up from the furrows to keep it dry; and crooked, because they had been formed at a period when a long team of draught animals were attached to the plough, which, on reaching the ends of the ridges, required a long sweep to turn on. But furrow-draining clay land will no doubt have the effect of altering the shape and form of its ridges. We are aware that the alteration of clay ridges is attended with considerable danger to the succeeding crops, and is therefore seldom attempted; but we believe that danger follows the alteration, only when the state of the land so altered has thereby been changed for the worse in respect to the facility of being kept dry. It is in all cases desirable that ridges should be straight, and also so narrow as to afford as many outlets as practicable to surface water. Of the two methods of draining formerly enumerated, that of Elkington is inapplicable to pure clay, because the impermeability of clay to moisture prevents the collection of springs in it; and of the different kinds of thorough draining, the furrow seems the only one suitable to it; because pure clay being generally a level alluvial deposite, the direction of the furrows in it follows the only line of declination of the ground, and therefore the only line suitable to draining. The furrow-drains should be shaped according to the nature of the materials which the clay can supply for filling them with. Since pure clays supply no hand-stones, which are the most proper materials for filling drains with, other substitutes than stone, which, when inconvenient to be brought a long distance, must of course be provided. The substitutes are clay, rough sods, peat, sand or gravel, and tiles. Sand or gravel is very seldom found associated with pure clay, and therefore cannot be expected to be found in any quantity. Worked clay may be formed and used as wedges, the opening under which permits the flow of water This is called "plug-draining," and requires a particular kind of apparatus for its construction, which has been described in vol. iv. p. 501. of this Journal. Rough sods when a little dried, form light tough wedges for drains, when placed with the grassy side downmost. Peat is a formation which is frequently found in large quantities on pure clay. When dried and hard it is very impervious to moisture, and therefore forms excellent material for drains in clay land. And in no class of soils are tiles so applicable to draining as in pure clay; and in it they are accordingly used in large numbers. They are better than any of the materials commented on for forming the open conduit at the bottom of drains. But the method in which they are usually employed is objectionable. They are laid in the bottom of drains on their sharp edges, and then heavy materials placed above them. Such a practice must have undoubtedly originated in an inconsiderate attention to the nature of clay, however tenacious it may be. The circumstance of the bottom of the drain feeling quite firm to the foot when formed, may have led to the belief that it would always remain so; but the fact is, that when water has run for a time on clay, a portion of its upper stratum becomes soft and pulpy. The sharp edges of the tiles soon cut through this clayey pulp, and the weight of the materials above them acting as a constant weight, sinks them still farther, and squeezes the pulp at the same time up into the bosom of the arch, thereby at length either closing up the orifice altogether, or separating it into detached portions. To obviate this inconvenience, tiles have been formed with broad phlanges or shoulders to rest upon, and which no doubt will prevent sinking better than sharp edges; but the most obvious remedy for the evil is laying firmly in the clay as a pavement, soles of tile or slate for the tiles to stand upon independently. Should the soles be made to sink with the weight of material above them, which is unlikely, on account of their broad surface, the tiles will sink with them, and thus keep the conduit always open. Nor should tiles be perforated with holes, as they only serve to render them weaker, and especially as the lines of space between them and the soles on both sides are quite sufficient to convey away all the water that will find its way down the sides of the drain: the holes being thus unnecessary

Dried peats, dried sods, tan bark, gravel, sand, whichever is nearest at hand, form excellent filling above the tiles, and should they be at a great distance, coarse but hard bricks should be made and burnt on the spot. The breadth of the drains at top and bottom should of course be much narrower when these materials are used than with stones.

Pure sandy soils, though apparently of an opposite nature to pure clays, are not so easily drained as might be supposed. Indeed, it might reasonably be supposed, that they should require no draining at all. But they, like clay, are a level alluvial deposite, and when free of, and do not rest on gravel, retain water for a considerable time. The texture of large flats of sand is very fine-grained, constituting what is commonly called *deaf* sand, which, when a little water is thrown hastily upon it, consolidates, and then absorbs any more moisture very slowly. Very frequently this sand rests upon carse clay as a substratum, and then, when not of much depth, it constitutes *quicksand.* Furrow-draining will render these sandy soils completely dry, although a drain in every furrow may not be requisite. Whether stones or tiles are used for their construction, neither of them should be employed without soles, otherwise the fine particles of sand taken up from the bottom of the drain, and carried along by the water, and deposited in the eddies, will in time fill up the conduit. Besides, stones or tiles without soles would inevitably sink out of sight in such a sandy bottom. When quicksands are met with, the drains should be regularly built through them, with the stones resting on flags, the spaces between the stones teethed up in the face with tough turf, and the conduit made large. The turf prevents the ingress of fine sand along with the water from the quicksand into the drain.

Gravelly, sandy, and loamy soils, resting on gravelly subsoils, are naturally so dry as to require no artificial draining, the gravelly soil acting the part of a universal superficial drain much more effectually than any of the systems of draining enumerated. Even a clay soil, if not too thick, resting on a gravelly subsoil, which is a rare arrangement of soils, requires no draining. A naturally porous subsoil is therefore better than any species of draining, inasmuch as it presents at all points channels for the conveyance of water, such as, for example, gravel, when a subsoil, generally appears in beds of great thickness, and is therefore capable, at every point where it is in contact with the soil, of conveying away any quantity of water that might fall from the atmosphere. Soils resting on gravel are generally prolific. A hazel loam of from eighteen inches to two feet in depth so situated, is perhaps the finest agricultural soil that can be desired. Every species of crop, white or green, can be grown upon it to perfection. Most of the green crops may be consumed upon it. Live-stock can always lie comfortably on it, and it can be worked with advantage at all seasons, and, of course, worked economically. We have heard a farmer who possesses a farm of such land, not a large one, for a large farm of such soil is perhaps not in existence, at least in Scotland, offer his ploughmen a roast fowl to their dinner on that day they got their feet wet at the plough.

Soils of moderate depth, when resting on rock, cannot be artificially drained. Stratified rocks, with a considerable inclination, and fissured rocks, form safe drains for soils; on the other hand, amorphous rocks of close texture, with little inclination, form the most impracticable subsoils of any material. Fissured and stratified rocks support soils of fine quality, whereas fine-grained impervious rocks render their soils almost sterile.

Instances of clay, sandy, and gravelly soils, resting on clay, sand, gravel, and rock, may be found in patches of considerable extent over the country; but when all combined, they form rather the exception than the rule to the general state of the soil in this country. The soils generally to be found consist of strong heavy clay, thin in depth, and not fine in texture; a thin clay, with a sharp gravel in it; a brown and black loam, deaf, and of very moderate depth below the plough; a thin sharp gravelly loam, of a brown or black colour; and a thin peaty and vegetable black mould, deaf, and loose. All these common soils rest on retentive subsoils, and possess very different characters. Subsoils display less diversity of character than soils. They consist chiefly of dark-coloured clay, coloured by the oxide of iron, more or less compact, and intermixed more or less with stones, from the size of small gravel to that of a man's hand; sometimes containing numerous boulders of various kinds of rocks, principally of the primitive class, and of various sizes; and almost always having thin horizontal contemporaneous veins of sand surcharged with water, interspersed through them. The surface-water finds in these veins of sand the only conduits to pass into the subsoil, where it remains impeding the progress downwards of the succeeding surface-water, until it finds a vent for itself into a drain, or is again evaporated by excessive heat into the atmosphere. The water which is prevented at all entering into the subsoil, by the repletion of the veins of sand, if not evaporated, remains accumulating with fresh supplies upon the surface of the subsoil, in the line of junction between it and the upper soil; which line, when exposed by the incision of a drain, never fails to present unequivocal proofs of the retentive nature of the subsoil, by emptying its copious contents of stagnant water into the drain, along the bottom of which it may be very perceptibly observed escaping like a tiny river. The draining of such subsoils constitutes the difficulty of the art, to overcome which difficulty is beyond the power of the pen. Experience and practice alone can determine whether it should be overcome with one method of draining or another. Were such draining effected, the whole of the presently undrained, but improvable soil of the country, would be rendered capable of receiving the benefits of numerous indirect modes of fertilizing it; the draining would be the first step towards improvement; but if neglected, and the soil permitted to remain as it is, every other means of fertilizing it will only prove comparatively abortive in their application.

---

## HORTICULTURE—ASPARAGUS, SEA-KALE, RHUBARB, ARTICHOKE.

By Mr J. Towers, Author of the Domestic Gardener's Manual, &c. C. M. H. S.

It has frequently occurred to me that works on Agriculture might, without infringing materially upon the object which they have chiefly in view, be rendered the vehicles of much important horticultural information. The culture of the field and garden are sister arts, and might go hand in hand together; many also of the products of the garden are grown to a still greater extent in the field, and the same natural agents equally act as stimuli upon both. I have therefore resolved to risk an occasional communication upon the cultivation of the most valuable garden vegetables; and though I profess not to instruct the practised gardener, I indulge the hope that the few hints which are derived from successful practice may not altogether be thrown away, or be unproductive of amusement and information.

In order to render the articles as immediately useful as possible, I intend to confine my remarks as closely as I can to those vegetables or fruits that are in season, or may be raised or cultivated in routine, at those periods which coincide with the publication of one or other of the numbers of this *Journal*; and, in the present instance, as the months of March and April are particularly favourable to the culture of asparagus and sea-kale, I shall, in the first instance, advert to them, and then as far as my limits will admit, refer to one or two other subjects to which a corresponding mode of treatment will apply.

I. *Asparagus* is a native of the sea shores of Britain, though, according to Dr Hooker, it is rarely found in Scotland: it is worthless in its native original state, but, as every one knows, is susceptible of the greatest improvement by culture, and becomes highly luxuriant in a richly manured, light, and mellow loam. The young sprouting stems, as they emerge from the soil, are used for the table; and these, if suffered to grow, and become fully developed, form one of the most graceful among the productions of herbaceous vegetation: the numerous branching lateral stalks, produce innumerable tufted, minute leaves, of the most lively and delicate green; at the angles (*axillæ*) of the smaller branches two or three pendulous flowers are situated; they are greenish, bell-shaped, and without any particular odour. Each flower consists of a calyx of six deeply cut segments,—six stamens,—one very short style, and its stigma cut into three divisions,—and a germen, becoming a scarlet globular berry, which contains one or more perfect seeds in its three cells. This plant forms, with others of the same genus, one of the families of the Asphodel tribe, *Asphodeleæ* of the natural system. How, and at what period the plant was brought into cultivation, it would now be vain to inquire; but it appears probable that, in England, it was little known before the seventeenth century.

The modes of cultivation practised with a view to bring the vegetable to the highest state of perfection, in the different countries of Europe, are too numerous and complicated to be now alluded to, much less described. It will be my aim to point out two processes by which fine highly-flavoured shoots may be abundantly produced. The one is not so much in fashion as formerly, but it possesses great conveniences; the other is more novel, and perhaps more scientific, as it may be made to conform to the hypothesis of radical exudation. The physiological reader will readily perceive, that, by adopting it, he can introduce other vegetables between every row of his asparagus, and thus avail himself of the nutritive matters which their radical processes yield to the soil: However, I shall simplify my directions, and confine them to the process of *forcing* early asparagus. These will be brought under one view in the succeeding notice of sea-kale.

*Culture in Beds.*—This is the method that has been adopted for a number of years, and recommended by most writers; but there exists great difference of opinion as to the way in which the beds ought to be formed. Much of the permanent success will depend upon the nature of the staple soil; and I hesitate not to say, that, unless the garden afford one which is light, loamy, and free from stones of any considerable size, to the depth of two feet at the least, the whole plot ought to be formed artificially, and the best material for the work is the thin turf of a meadow of short growing grass, or that of a common where sheep abound. Such a soil is replete with vegetable, decomposable matters; and, in fact, is very suitable to the cultivation of every product of the garden, unless it be that of a few vegetables which prefer a stiff soil, or one of an entirely opposite description, and approaching to the nature of sand.

Turf may, however, prove a defective material, if it be produced upon clay or stiff loam; but, in ordinary cases, that of a common or sheep-walk is of a medium texture, and breaks down into a rich light earth, which, while it can be digged and pulverized with freedom, is also sufficiently compact in texture and retentive of moisture. If a store of turf, an inch and a half in thickness, could be readily obtained, I should prefer it to any other species of earth whatever. An asparagus bed is not the work of a day; if well laid out and properly planted, it endures for years, and repays any ordinary cost and exertions; but it would be better not to undertake it at all than to perform it in an unskilful and slovenly manner. If the soil of the plot selected be already free to the spade, deep, and equable, it may be brought into a state nearly equal to good natural turfy loam, by the liberal addition of a well reduced and black leaf-mould. Having thus premised, I would recommend the formation of two beds by the process now to be described: the one will exhibit the progress of the plant from the *seed*, and perhaps will form the most perfect plantation; the other will come into full bearing at an earlier period, but not by any means so much so as many persons are apt to imagine.

*Preparation of the Beds.*—Select a piece of ground of about thirty feet long, ten feet wide, and open to the full south sun, so that its rays may fall in the direction of the length of the beds. Open a trench, two feet wide at one end, and wheel the earth to the opposite end, or rather to a spot two or three feet beyond it: this implies that the soil is good, otherwise it should be wheeled or carted away, to be employed for other purposes. Have ready, and close by the plot, six cart-loads, at the least, of well-wrought leaf-soil, sea-weed, or, in default of either, of perfectly good spit-dung. If fine turf be employed, one half of the above quantity of the *enriching substances* will be sufficient. The first and every succeeding trench is to be digged and cleaned out at the bottom, to the depth of two feet or more, as the good soil may indicate. It has been recommended to trench four and five feet deep, with the assurance that a proportionably great and permanent crop of the asparagus would be produced. I have tried two feet and thirty inches, and believe that a perfectly well enriched soil to that extent, will be more efficient than six feet of a dead, cold substratum. At all events, a good six-inch layer of rich manure should be laid at the bottom of each trench, and the first being cleared and so prepared, the soil and a due proportion of the manure are to be put into it, and mixed as equally as possible, till the earth be raised at least six inches above the old surface level. Thus the work is to proceed, trench after trench, until the entire plot be filled up with *thoroughly moved and incorporated materials:* the last trench must be filled with the earth out of the first. At this stage of the work it will be found that the reserved earth will be insufficient to complete the plot: in order, therefore, to equalise the surface, it will be prudent to dig the bed again in a contrary direction after an interval of a week; and previous to this operation, I would recommend that about a gallon of common salt be regularly sprinkled over the whole surface; it will tend to bring the bed into that chemical condition, which a constant dressing of sea-weed would induce.

Having thus described the preparation of the bed, I observe once for all, that if turf be in plenty it cannot be made too deep; and this will hold good in the preparation of all garden plots where *vegetables alone* are to be grown. For *fruit-trees*, I believe that eighteen inches of pure maiden turfy loam, without one particle of animal manure, over a six-inch stratum of coarse stones, brick-bats, rocky fragments, or the like, would be a more fertile medium of growth, and one infinitely more conducive to the health of the tree, than double the depth of a highly enriched garden soil. This digression will be permitted, as it includes a general remark applicable to culture in most departments.

The bed thus double-digged will be ready for cropping, and though it might be as well to have thus prepared the soil during the dry weather of the winter, it will yet be in good time if the work be accomplished during the month of March. After the ground shall have settled for a week, two beds, each three feet wide, should be marked out, and this width will admit of an alley between the beds, and one on each side of them, more than a foot in breadth. To form these, strain a line on the outside of the beds, and two down the middle space between them, so as to mark out the limits of the beds, throw the earth out of the alley upon the beds, that their surface level may be six inches above the base of the alleys. If turf be at hand, it would be right to place three inverted well cut turfs the whole length of the alleys, and thus to form good and solid walks; a dressing of salt should then be sprinkled over the turf to prevent the growth of the grass. Some persons use a deep layer of ashes; but whatever be the material employed, the beds ought to be raised a few inches above the walks, not, however, to provide for drainage, but to render the future culture convenient, and to give a finished appearance to the plantation.

*Sowing Seed.*—Early in April and in fine weather, stretch a line three times up and down the bed, by means of stakes driven into each end, exactly one foot apart, and the like distance within the sides; draw three drills an inch and a half deep, with the angle of a hoe, and make the bottom of each drill, even, by pressing into it lightly a straight even pole, like the handle of a long rake. Scatter asparagus seed as regularly as possible along the drills, or if the seed be known to be good, three or four seeds may be carefully dropped at inch distances, in spaces nine inches apart: the ultimate object is to obtain one good plant, at every space of nine inches, therefore the good sense of the gardener will guide him so to manage the seed-sowing, as to combine economy of seed and time with security of result. Bad seed taken out of very old berries may perhaps scarcely produce one plant from twenty grains, though the seeds will remain good for three or four years.

When the young plants germinate they should be permitted to grow to the height of three inches, or till the leaves become perfectly developed, and it appear which plant will prove strong. If two arise close together, one should be removed as soon as possible, by means of a flat, sharp-pointed stick, and the whole should be thinned out early, so that there may be a space of two or three inches between plant and plant. The spaces between the rows must be kept clean by passing a flat or Dutch hoe cautiously over the surface, and as the plants acquire strength they may be thinned out to four inches apart; but it would be rather imprudent to attempt a more severe thinning-out during the first year and till the winter pass over, as it will be impossible to decide to what extent extreme moisture of the ground, frost, snow, and other enemies may prove destructive during the torpid season. If the plants stand the winter well the supernumeraries may be employed to great advantage; but of the use to which they may be turned, and, indeed, of the treatment of the seed-bed during autumn, nothing need now be said.

*Planting Asparagus Beds.*—This is the method usually adopted, and plants two years old from the sowing are generally recommended. I believe that the age is of little consequence as far as security may be considered; and that, three or four year old plants may be employed when it is the object to obtain produce within the period of twelve or fifteen months. Yearly plants are safe also, and these may be planted four inches apart in shallow trenches, or open drills, cut with a spade along lines stretched very tight, and at the distances mentioned before. The plants should be placed so deep as to permit the crowns to be covered with two inches of fine earth, and the roots ought to be let down to their full extent into the ground in a rather open and expanded order, and be perfectly coated, and in contact with the soil. Dry weather at the close of March, or early in April, should be chosen; because the earth, when it is in a free and open condition, may readily be made to fall among the stringy processes of the roots; but when planted, each row should be liberally watered once, to fix the plants securely, and to enable them to start into growth without any loss of time. The routine culture of the beds will be in all respects similar to that before described; and if blanks occur in consequence of the decay of some of the roots, they may be filled up with young growing plants, as late even as the middle of June; provided that each be raised from the seed, or nursery-bed, without injury, and be set immediately during cloudy weather, or in the evening, and copiously watered. The second method of planting, with a view to forcing, will be described hereafter. I defer any farther observations for the present, as respects the general routine culture, merely remarking that, from *seed-beds*, in carefully prepared ground, I have cut very good asparagus in two years, that is, in the third season after the sowing.

II. *Sea-kale* (*Crambe maritima*) is found on our sea-coasts; it belongs to that natural order which includes all the cruciform flowers (*Cruciferæ*): the stamens are six in number, two of which are shorter than the others; hence the plant is classed in *Tetradynamia*, and is found in its first order, *Siliculosa*; the seed vessel or "pouch" is round, smooth, and about the size of a black currant. The root of the native plant—according to Sir J. E. Smith—is large and fleshy, much divided at the crown. *Herb* very glaucous (*sea-green*), smooth, rather succulent. *Stems* several, from one to two feet high, branched, spreading, leafy. *Leaves* stalked, spreading, or deflexed, large, undulated, and toothed, of a leathery "(*coriaceous*) texture; the lowermost somewhat lyrate; the rest roundish acute." *Flowers* in dense terminal clusters, milk-white, yellowish in the centre, *fragrant*. This description accords sufficiently with the appearance of the cultivated plant; and in fact, it is known that the inhabitants of the countries where it grows wild on the shores, have always been in the habit of observing the first progress of the young shoots as they emerge from the sand, and of cutting them under the surface. In this state they are merely a species of green kale; but by culture the shoots become a most delicate vegetable, which, while it precedes asparagus, combines much of its peculiar flavor with that of the best borecole, or *chou de Milan*. *Sea-kale* was introduced to the gardens about seventy years ago; it is now found in all the best establishments; and its culture, though peculiar, is as easy as the plant is prolific. It can be raised from seeds, and be brought to the table early in the second year. By transplanting, and division of the shoots and roots, it may be propagated abundantly, and at any season of the year, and is so hardy as to withstand any common degree of frost.—The *Soil*, as indicated by its native situation and habits, should be light and sandy, with a slight addition of mild lime, muriate of soda, and wood ashes. The beds ought to be prepared as for asparagus; and of a light sandy turf, with a natural manuring of sea-weed alone, or artificially—with one-fourth of a compost consisting of perfectly reduced fern, or leaf-mould, nine parts—wood-ashes, one part—and about half a pound of common salt to every barrow-load of the compost. This last chemical compound contains a large proportion of the components of sea-water, and the wood ashes yield carbonate of lime in its most effective state, also some carbonate of potassa, and fine silex. Three barrows of light sandy turf, and one barrow of the above compost, give proportions which promise to yield a medium of growth of the most permanent and effective character. In it sea-kale and asparagus might be grown for forcing, either side by side, or in separate plots, the treatment of the one would be applicable to the other; and therefore one description will suit both. I only observe, that, if neither turf nor sea-weed can be obtained, good kale can be produced in any light garden soil, trenched in the manner before described for asparagus beds, and manured copiously with wood (not coal) ashes, and the prescribed quantity of common salt. All the difference in the two beds is this, that for *sea-kale*, or forced asparagus, the plot of ground should be large enough to permit the plants to stand in *single rows* three or four feet apart. The rows may be of any required length according to the quantity likely to be consumed. Supposing that six or eight rows, each twelve feet long, be required, then the ground is either to be trenched twenty inches deep at the least, or digged out and replaced with the enriched turf; and the work ought to be completed before March, so as to become settled by the middle or latter end of that month. Between every row there should two stakes be set up at each end, two feet asunder; these will mark the *beds* and the *spaces* between them; thus there may be eight beds and nine spaces or divisions. At the time of *sowing* the beds—(I greatly prefer seed to plants)—leave a space on the outside of two of the outermost stakes, and strain a garden line exactly along the middle of the bed immediately within, and next to it; and beginning at one end of the line—but a foot within it—make a small ring or circle with the finger, an inch deep, and three inches wide; or what is better, force a circular piece of iron or wood into the ground to the required depth, and drop three seeds in the ring so formed, equidistant, and at right angles with one another. Form and sow the rings about fifteen inches asunder—centre from centre, the whole length of the line; then cover the seeds to the surface depth with sand, and pat it to a level with the flat of a spade; one row or *bed* will thus be sown. Leave the adjoining *space* of two feet vacant; and proceed to the bed or division next beyond it: sow that, and proceed in the same alternate order till the plot be completed; when a space exterior of the last sown division must be left, and it will then be found that whatever be the number of divisions sown, that of the unsown *spaces* will exceed it by one. The plan thus laid down is grounded upon the practice of the celebrated Bath cultivators; and nothing can exceed it for the facility it affords to good tillage, and orderly, convenient forcing. It must be apparent to every one versed in horticulture, that *Asparagus* can thus be sown or planted, and be cultivated—*for forcing*—with every advantage afforded to sea-kale, as will be further shewn in the detail.

If the seed be good, the season propitious, warm, and moist, germination will rapidly advance; and when the plants appear, they may be secured from vermin by sprinkling around and within them a good covering of wood-ashes (three parts), blended with soot and powdered lime, of each one part. If weeds arise and threaten to surmount the plants, they must be kept under by surface-hoeing to the depth of an inch, with the “Dutch,’ or thrust-hoe. Perhaps three plants will rise from each ring, and these, indeed *all* that grow, must remain till they begin to interfere with each other; then, one only, the strongest, must be left, and the others drawn, or raised up; so that a complete row of single plants, from 1 foot to 15 inches apart, finally remain. The young supernumeraries may be set out in rows, to grow for succession, or be thrown away if no more stock be required. The plants in the rows will grow luxuriantly, and become very large, so much so as, in all probability, to come in contact, forming one connected line of sea-green foliage. All the culture during the summer and autumn, will consist in keeping the *beds* clear from weeds, and in digging alternate *spaces* two or three times, to the depth of 9 inches, so as to pulverize and render the soil as fine as possible. At the two last operations (say in July and October), it would be as well to incorporate with the soil a two-inch layer of decayed leaves, mixed with one-fourth part of pure wood-ashes.

The reader will be very careful to avoid sea-coal, or even pit-coal ashes. It formerly was the custom to cover sea-kale with conical hills of those ashes during winter, and one out of three or four plants perished, the damage being ascribed to mice or moles. I never have lost a plant since I left off that acrimonious chemical compound, styled ashes, nor could I, by any means keep my bed entire, while I employed it. Its destructive influence has at length been admitted, and sea-kale now enjoys a regular growth, and repays its cultivator. No *forcing* ought to be attempted during the first winter; but it would not be amiss, after clearing off all the old leaves, to strain a line along the edges of the beds, and, cutting the earth by it three inches deep, to mould up the *two feet beds* with the earth taken to that depth from the intermediate spaces. A tall marking stick should, however, be placed near the centres of the plants. After the "earthing up," a blanching-pot, wooden box, or old bee-hive, is to be set over every plant. A straw-hive is indeed an excellent material. It is sufficiently strong, warm, and impervious to light, even when used alone, without leaves, for blanching. A small or even a very tolerable gathering of fine white kale will be the result of this treatment, earlier or later, according to the season and climate; and, in cutting it, the knife should be passed below the surface of the stratum of soil that was added, so as to bring up each full-sized shoot in a compact state, and not in detached leaves. The smaller sprouts ought not to be cut; and, when all the large ones have been taken, the superposed soil should be drawn back into the *spaces*, and the whole plot reduced to an even surface-level. This work will, it is presumed, be performed about mid-April, and then a knife, or very sharp-edged spade, should be passed through the shoots, so as to cut off every one that rises above the original level of the bed. This cutting will induce the plants to send forth a number of fresh shoots, and prevent, in a degree, the protrusion of flower-stems. The routine culture of the second season will comprise *weeding* with a flat hoe, *digging* and *enriching* of the *spaces*, as before directed, and the immediate *excision* of every flower-stem that may be sent up.

*Forcing.*—(These directions will apply equally to asparagus in single rows, by the second method.) After the leaves of the sea-kale, and stems of asparagus have become inactive, remove the former, and cut off the latter. Mark each sea-kale plant with a tall stick, dig and mould up the beds with fine earth from the spaces, as in the previous season; but now, and in each succeeding year, dig out, and remove to a spot at hand (as convenience may point out), the earth of each space, on the sides of those rows which are to be excited, so as to leave trenches one foot deep. The plots ought to be so contrived as to furnish three distinct forcings, the *first* to commence late in November, to be cut at the close of the year; the *second* about the first week in January; and the *third* early in February. A *fourth* reserve ought to come in at the natural season, *blanched*, but not *forced*, in April. The trenches are to be filled to the level of the tops of the line of pots or covers with tree-leaves, blended, if possible, with one-third part of fresh stable-manure. When this level is attained, the pots, and spaces between them, must be covered to the depth of two feet with the same materials; but for asparagus, *which can have no path*, leaves alone are recommended to the depth of 18 inches. If shallow boxes or troughs, formed of three strips of boards fastened together, and five or six inches deep, could be inverted over the whole line of asparagus, the mixture of dung and leaves might be safely employed.

The bed of fomenting material, in either case, ought to form a compact mass of equal depth; and this it would be advisable to cover with straw hurdles or thatch, to keep out excessive rains, and to retain the developed heat. Trial-sticks should be thrust deeply into the masses; and if these, on being withdrawn, feel gently warm, the work of forcing will proceed regularly; and kale and grass will be procured in succession from Christmas to the end of March; to be succeeded by the crops from the unexcited bed. After forcing, and clearing off the leaves, &c. the trenches are always to be filled up, and the surface-level restored. The slight difference to be observed in treating these two delicious vegetables, will soon be sufficiently obvious to every cultivator of discernment, and need not be alluded to at this time.

III. *Rhubarb.*—My notice of this exquisite vegetable shall be comprised in a few lines; but these, I trust, will avail to extend its culture more and more; for any thing more productive, salubrious, profitable, and expressly suitable to the purposes of the cottager, can scarcely be found in the entire list of vegetable productions. A few years only have elapsed since the rhubartic hybrid, *green* rhubarb, was cultivated for tarts, and held in very slight estimation; but since the introduction of the larger (giant) varieties, the demand has increased with surprising rapidity. Of the two sorts which I earnestly recommend, one is called, if I mistake not, *Radford's Scarlet Goliah*; and the other is a small *red* variety, which is crimson throughout when boiled or baked. These will supply the table from April to August, and suffice for every purpose.

*Culture.*—Let the ground be prepared precisely as for asparagus beds. Select clean offsets, with two or three bold eyes: the first week in March is a very suitable season. The eyes or buds of the Goliah will be of a deep, rich red, hence its name: the leaves, however, and stalks are green, though of different hues, and the latter are spotted and streaked with red. In the smaller *pink* variety the red tint prevails throughout.

The plants of the great Goliah should be set firmly in the soil, five feet apart, or five feet one way and four feet another; the smaller kind may be set three feet asunder, plant from plant, giving a free watering to each to settle the soil among the roots. Dry weather, an open condition of the ground, and a temperate, unfrosty state of the air, should be preferred. When the growth becomes established, the ground must be kept free from weeds; and if dry weather supervene, water ought to be freely given around the roots, two or three times, with intervals of four or five days.

Not a leaf or stalk ought to be touched during the first year; and in autumn, when the leaves are all decayed, they should be laid in little trenches formed along the centre of the spaces between the rows, sprinkled with a handful or two of salt, and covered with the earth that had been digged out. Thus the plant will itself furnish a portion of the manure that will annually be required. As winter approaches, a coating of well-decomposed stable manure or leaves, or a mixture of both, two or three inches deep, should be laid round each plant, to the extent of two feet; and in the open weather of bruary, the whole bed must be forked over.

As a proof of the excessive productiveness of the *Scarlet Gollah*, I need n mention, that, in the second week of March 1831, twelve plants were se ground prepared for asparagus. In June the leaves met, and the whole was covered. In 1832 the plants yielded profusely, many leaves measu above a yard and a half over the surface, the footstalks being an inch a half broad, and from two to three feet long. The outside leaves were, as quired for use, stripped off by an oblique pull, not cut; the family was am supplied till July and August, and yet the plants increased; the neighb also were furnished with *leaves* throughout the summer, and with *offset-pl* in the succeeding spring. During the two past seasons the root-stock creased to such a size, that, when it became needful to remove some, it quired a barrow to contain the weighty mass that was raised, after g labour, from the soil. If any one try the experiment in favourable soil, with any thing like judicious management, he will scarcely fail to disc that the growth and production of the plant will exceed every demand can be justly made upon it.

IV. *Artichoke* (*Cynara Scolymus*) *Syngenesia Polygamia Æqualis* (Cl. ord 1.), *Linnæi*; tribe CARDUACEÆ; among the *Compositæ* or the comp flowers of the natural "*Jussieuan*" system, is, as the tribal name im nearly related to the thistles; the observant natural physiologist mu aware of this from the imbricated order of flowering, and the dense close which contains the bluish flowers, and the seeds surmounted by a fea down (*pappus*). In England the full heads only are eaten boiled; these consist of a fleshy receptacle, on which the flowers and their bristly ap ages are based; and of an alternating series of scaly bracteas or floral (*involucrum*), that are furnished with a pulpy substance at and above point of union with the base.

*Culture.*—All that has been previously said as to the preparation ground for the asparagus, will apply to this valuable autumnal vegetab delights in a rich and light soil; therefore a sandy turf will supply the priate medium of growth. *It is propagated by suckers* or offsets taken fr plants, and planted in March and April, either in a bed of three rows, five feet asunder, the plants three feet from one another, or in single between other vegetables. The soil ought to be previously digged a even; and the line, being strained very tight, each sucker should be by the dibble or garden trowel, and fixed securely in the soil. Nothing so effectually to promote the growth of any sucker or offset as to pl base, and the lower parts or joints of its stem, firmly in recently ground. The vital principle thereby becomes stimulated, and, to spe mically, is acted upon by the electro-gaseous products of the soil at ment of their development. Water, if the weather and soil be dry time of planting, ought to be then freely given around the plants, sequently, more than once, in order to fix them in the soil, and prom nation of the vital fluids.

The subsequent culture consists in keeping the ground clean and ly open; and, at the approach of frosty weather, to draw earth about the stems, as in landing up celery, but not bringing it to so acute a ridge at the top. Artichokes may be abundantly produced in the autumn of the first year; some plants will not, however, be prolific. The fruit ought always to be gathered, and the stems cut close off prior to the winter earthing-up. In the second season the plants will become abundantly more prolific, and great care should be taken to preserve them from extreme frost by straw, haulm, or evergreen boughs, laid upon the ridges of soil so as to form a sort of roof over the herbage; but these coverings should be removed in rainy weather. The heads may be preserved throughout the winter and early spring months, by insetting the lower ends of the stems in sand, under shelter of an outhouse or cool dry cellar.

The artichoke plant produces abundance of suckers, which ought to be detached in March—not in the torpid season, and of the best of these fresh plantations may be formed. We suggest, on the ground of the doctrine of *radical excretion*, that, if the plants stand in single rows widely apart, between which a rank of potatoes, beans, or peas, be grown,—the new suckers be planted on the site of such crops, in order to reap the benefit to be derived from the matters ejected into the soil by their excretory organs, and by the actual deposition of detached vegetable fibres.

Thus artichokes and annual crops may be made every two or three seasons, to alternate or "rotate" with each other.

## RETROSPECT OF THE CORN TRADE IN AMERICA DURING 1835.

By Mr W. Gray Fearnside, Mark Lane, London.

In *Canada* during the early part of the season, hopes were entertained by the agriculturists that their anxious labours would be crowned with an abundant return; wet weather, however, having set in, as the grain was attaining maturity, these anticipations were disappointed, though the result is not so fatal as was at one time expected. The harvest has been unusually protracted, owing to the ripening of the crops having been retarded by the rain, and reaping consequently postponed; the progress of the plough has also been much impeded. Wheat has proved deficient as to an average yield, but the failure not so extensive as was latterly apprehended. The damage caused by the worm has been considerable, and more so than usual, as the grain having been kept for a lengthened period in a green tender state, instead of having become hardened, the grub was thus enabled to continue longer its depredations; much also has been destroyed by sprouting in the field. The barley crops, considering all the circumstances, far exceeds the expectation, and the quality excellent, though some complaints are made that the ears have not filled well. Many farmers likewise have suffered severe loss by allowing the grain to stand ripe even two or three days. The oat crop is, generally speaking, well housed, and quality good, though in some instances the corn is thin and light, and having in parts been affected by frost, has been obliged to be cut green. Potatoes have been plentifully cultivated; in high situations they are remarkably good, and have yielded abundantly, but in low grounds, where rains have lodged, they have suffered much; in some places amounting to a complete failure. For Canada this is a most valuable root, and merits the attention of every agriculturist. Beans have produced well. Peas, also, have proved a plentiful return on high light soils, but are for the most part podded, and on low grounds have suffered from mildew. The failure in the wheat crop will, it is feared, turn out injurious to the flour trade. The latest quotations were 4s. 11d. to 5s. 1d. per 60 lb. for Upper Canada white wheat; 4s. 8d. per do. for mixed red; Lower Canada red per minot, 5s.; best flour, 27s. to 27s. 6d. per barrel of 196 lb.

In the *United States of America* the flour and grain trade at the commencement of the year was ruling low, as the following rates will exemplify :—

| | Wheat. qrs. | Rye. qrs. | Indian corn. qrs. | Flour. barrels. |
|---|---|---|---|---|
| New York, | 27/6 to 38/10 | 27/6 | 23/6 to 27/6 | 23/1 to 24/1 |
| Philadelphia, | 34/10 36/8 | 26/3 | 20/6 22/ | 21/11 22/6 |
| Baltimore, | 34/10 36/8 | 22/7 | 22/ 22/7 | 21/ 21/4 |

In March, the navigation of the canals generally commenced, and a considerable degree of activity pervaded all the leading markets. Towards the end of April and beginning of June, reports were prevalent of a failure in the crops throughout the southern states, owing principally to the severity of the winter, which was extended to an unusually lengthened period. At Philadelphia, many rumours were circulated among the lower classes of " a famine in New York," which originated in the enormous advance in the price of provisions of all descriptions. At New York, it was stated, that, from letters received from the grain-growing region of the state, it was to be apprehended that there were too well founded grounds for the advance in prices, in consequence of the short supply left over from the previous crop, and the injury received from the severe winter by the growing wheat. From Virginia it was reported, that fields which in ordinary seasons would yield twenty bushels to the acre, were ploughed up and sown with Indian corn and oats, and many farmers willing to compromise for their seed. Prices in consequence rapidly advanced, and the currencies attained the annexed high rates:—

| | Wheat.<br>qrs. | Rye.<br>qrs. | Indian corn.<br>qrs. | Flour.<br>barrels. |
|---|---|---|---|---|
| New York, | 55/ | 42/2 | 38/10 | 32/7 |
| Philadelphia, | 49/6 | 34/10 | 31/2 | 29/3 |
| Baltimore, | 51/4 to 55/ | 33/ | 34/10 | 31/3 |

The result, however, of the harvest has not been so disastrous as was anticipated. In the Pennsylvanian districts, wheat was nearly an average produce. From Baltimore the advices were, that though the crops were not so abundant as in former years, yet there were extraordinary instances of the strength of the soil in developing the richness of its products; the ears of wheat being extremely large, and a few heads of barley were furnished with two rows of seed more than are commonly found in that species of grain. In Virginia the failure ultimately proved extensive; but, though the amount of exports are likely to be much curtailed, rendering the West Indies and South America more dependent on other countries for supplies of flour and grain, yet we apprehend little chance exists of foreign imports being required to meet the home consumption. Prices are gradually receding, though still maintaining a considerably enhanced ratio of price as compared with the early part of the year; wheat realising 45s. to 48s. 4d.; rye, 25s. 8d. to 31s.; flour, 27s. 1d. to 28s. 1d. per barrel.

[These remarks would have appeared along with the general retrospect of the corn trade in 1835, given by Mr Fearnside in the last number, had they come to hand in time.—EDITOR.]

## ON THE APPLICATION OF THE POINTS BY WHICH CATTLE ARE JUDGED,—VII. TO THE FIFE BREEDS, &c.

By Mr James Dickson, Cattle-dealer, Edinburgh.

The ordinary breed of cattle in Fifeshire is called "Fifeshire Runts." The old celebrated breed is called the "Falkland" breed. Falkland used to be the favourite hunting seat of the kings of Scotland, and in that neighbourhood the stock used at the royal table were kept. It is said that the Falkland breed derived its origin from the Devon, Sussex, or Hereford cattle, some of which had been imported into Scotland by royal command. Be the origin what it may, it is not unlike those breeds in form and character. The Fife Runts have a rather ragged outline, the line of the back being below the level line, and not straight, the general symmetry not being equal to that of the Angus or many of the northern breeds. The legs are rather long, and bone coarse; the hair is smooth, and the skin handles rather hard; the horns are long, flat, and thick; the features of the face are strongly marked, and in expression rather dull. Their general appearance is opposite to gaiety. As might be expected, after this description, they have not an aptitude to fatten at an early age; but, when aged, from three to five years, they feed to great substance and heavy weights. They are useful for ship beef. This description applies to the presently prevailing Fifeshire breed, but the old breed which is now uncommon in that county, is of a much finer description. They are finer handlers, have finer bone, more gay in their appearance, having the horns long and sharper pointed; more beautiful symmetry, better quality of beef, and greater aptitude to fatten than the present breeds. When aged, the common breeds feed to great weights, but it would be of no use to attempt to feed them when young, as they are deficient of quality and aptitude to fatten; Some of the very heaviest cattle bred in Scotland are bred in Fifeshire; but I must say they want many good points to make them profitable cutters to the retail butchers. They are much better suited to the shipping butcher. In the fat markets, at

Cupar in spring, I have seen many large lots of well fed cattle, but quality and symmetry are not to be looked for in the common Fife breeds. The butchers, however, are seldom deceived by them, as they are generally good weighers.

The cattle of Kinross-shire is much the same as those in Fife, and so are some in Clackmannanshire. Many of them in those counties are fed at distilleries, such as by the Messrs Young at Burntisland, Mr Stein of Killbeggie, Mr Moubray of Cambus, and others. The refuse from the malt distilleries has not the feeding properties of that from raw grain. The saccharine matter in the grain is almost wholly extracted by the process of malting; but the processes of the distiller, however ingenious, cannot extract the whole nutritious matter from raw grain. This great difference in the nature of distillery refuse makes a similar difference in the quality of the beef fed on it. Malted refuse renders the beef and tallow soft, and unlike to well fed beef; whereas the refuse from raw grain fattens as well as Swedish turnips, both as to weight, fatness, firmness, and quality. Hence, at the latter distilleries, stakes for tying up cattle to feed let much higher than at the former. Fine beasts are thus fed by Messrs Haig at Lochrin distillery, near Edinburgh.

On comparing the old or Falkland breed of Fife with the present breeds which cover that county, its superiority is very apparent; and its character was well exemplified by the large ox which was shewn by Mr Bruce of Kennett, and which gained the premium for the best ox exhibiting the greatest weight, symmetry, and fatness, at the Highland Society's Show at Stirling in 1833. Negligence or oversight alone in the breeders of Fife must have deprived them of the good old breed for the present inferior race of cattle. It is satisfactory, however, to observe that they have become sensible of their error, for now breeding stock of the old breed are increasing in the hands of many breeders in various parts of the country. Colonel Lindsay of Balcarres, Mr Russel of Balwharg, Mr Fernie of Kilmux, Mr Thomson of Pusk, and other spirited farmers, have now breeding stock which realise good prices.

Good as certainly the old breed of cattle in Fife is, still the lower portions of that county are admirably adapted for the rearing of short-horns, which are indubitably a superior breed of cattle to either of the Fife breeds. It is not easy to account for the aversion to short-horns, which most of the breeders in Fife have no hesitation in evincing. Had this aversion arisen from a disappointed experience in short-horns, there would be some reasonable ground for maintaining it; but when it is well known that good thorough bred short-horns have never yet got fair play in that county, I cannot but choose to ascribe that aversion to prejudice. Some breeders no doubt have tried what have been designated short-horn cattle; but most of them which I have seen in Fife have only the name of that breed, but do not possess its characteristic properties.

### VIII. To the West Highland Breed.

With the exception of the aboriginal breed of cattle, a few of which polled, and of a dingy white colour, are still to be seen in the park of the Duke of Hamilton at Cadzow, the West Highland or Kyloe breed is the oldest in Scotland. Its primitive site was probably in the Hebrides in the Isle of Skye, where it had long been kept from intermixture with the breeds of the mainland, by the independent position which the chiefs of the Hebrides affected to maintain against the kings of Scotland and Norway. Be that as it may, the purest Kyloe blood is to be seen in the Isle of Skye to this day; not that it is in Skye that the largest of the breed is found, for the richer pastures of Ross, and Perth, and Argyll shires have promoted its growth to a considerable size; but, when any breed of kindred blood is desired to be improved, the smaller and purer race of Skye is always resorted to for the purpose of improvement. It is pleasing to observe the desire for retaining the blood pure so universal among the breeders of West Highlanders. Besides the qualities of the bull, great attention is paid in selecting fine cows, which will hardly be parted with at any price so long as they are capable of vigorous reproduction.

The character and properties of West Highland cattle are much to be admired. The back is straight and level, the carcass deep, with the brisket well forward, and wide, and the buttocks well filled up. The top of the back is broad, and its breadth is preserved from the rump to the top of the shoulder:

The legs are short, with a strong broad fine bone. The muzzle is fine, with the nose a little turned up, the eye full and sparkling, the ears thin, broad, and hairy, and pricked, and the head surmounted with wide-set, fine long tapering sharp-pointed white horns, gaily set off at the points, the tips being black. The coat is shaggy, with long fine soft hair, not the least curled, and the top of the head, mane, dewlap and tail-end ornamented with the same kind of long hair. Colours are black, sometimes red, dun, and brindled, all of a rich hue. The skin is mellow, and the touch kindly. They have great aptitude to fatten at an early age, laying the beef, which is of the finest quality, on the most valuable points. Taking them all in all no breed which I have yet noticed approaches in character and properties so near the short-horns as the West Highlanders. The climate of that part of the country which they inhabit is not cold, but wet and boisterous; and, as a suitable protection against the elements, their shaggy coats are well adapted. They are first-rate grazers, feeding on grass with great rapidity on their native pastures; and, when they are brought into the arable districts, they thrive equally well on turnips. The usual weight which they attain, when fat, is from thirty to fifty stones, according to the size of the particular variety, for there are several varieties of them among the Western Isles. These varieties also exist as breeding stocks in Argyll, Perth, Stirling, Dumbarton, Ross, Inverness, and Sutherland shires. In every situation they are the finest *native* breed of cattle in Great Britain; for a combination of quality of beef, aptitude to fatten, and purity of blood. Should they be fed on from the time they are dropped, they could be disposed of in fine fat condition at three years' old, at from forty to fifty stones.

According to the present system of farming in the Western Isles, the pastures are overstocked in summer, and the young cattle are starved in winter. Could this system be altered, so as always to be increasing the condition of the cattle, the breeders would very much serve their own pecuniary interest, and promote the health and comfort of their cattle. Thousands of these cattle are presented to market every year, and fed and slaughtered in every part of Scotland and England, to the southward of their native latitude. They are generally presented in lean condition; but would the breeder relinquish the overstocking system, they would, on the whole, draw more money than they do, and command at all times a ready market; for purchasers will be found for such fine cattle in the worst of times, when the coarser and larger breeds would be neglected. When fat they are beautiful cutters up for the retail butchers, and are excellent for summer killing, and profitable for family use. The beef always fetches the highest price per stone in the markets.

I may mention the names of some eminent breeders of West Highlanders. Mr M'Donald once had fine specimens on the far-famed Island of Staffa, the interesting resort of summer visitants; as also his late father, Mr Colin Macdonald of Boisdale in South Uist. In 1812 and 1813 Staffa sold his three years old at Dumbarton at thirteen and fourteen guineas a-piece. Having kept a score of his three years old, he sold them in 1814, when four years old, at Dumbarton, to Mr Wilson, factor to the Duke of Hamilton, for twenty guineas each. At this time Staffa kept from eighty to a hundred breeding cows. In 1815 he sold a bull for 130 guineas, for which he refused two years before 200 guineas; and about the same time he received 100 guineas for another bull. These prices certainly indicate that Staffa's stock were of a very superior description, and that he must be classed amongst the most eminent breeders of West Highlanders. The late Mr Mackinnon of Corryhattan in Skye, had a large and fine breeding stock of the true Skye breed; and his stock was often resorted to as a source from which a supply of superior bulls and breeding stock could at any time be obtained, and always realised high prices. The late Mr Macdougal of Macdougal and Lorne, and the late Captain Macdougal of Kerrera, were good breeders. Colonel Campbell of Knock in Mull has also a good stock. Colonel Maclean of Coll, Mr Donald Campbell, late of Auchnacraig, and Mr Stewart of Auchnashannig, all possess good stock. On the Island of Islay the Kyloes are particularly large. Mr Campbell of Islay is a great improver and breeder, and one of the most spirited and liberal landlords in Scotland. It would be well for Scotland were all landlords similarly disposed. His stock of cows is very extensive, and of a superior cast. He has sold bulls at great prices, from 100 to 200 guineas a-piece. The colours of his cattle are mostly red and dun. In this island, Captain Walter Campbell of Sunderland, and Mrs Campbell of

Balnabie, each keep about 100 breeding cows. Mr M'Niel of Lossit is also an extensive breeder. The pastures of Islay are fine, and, from its mild climate, the island is called "fertile Islay." Mr Campbell, the proprietor of the Island of Jura, which is more barren than Islay, is an extensive breeder. He will sometimes shew from 80 to 100 four year olds at one time. On the islands of Colonsay and Oransay, lying on the north and west sides of Jura and Isla, Mr M'Neil, the proprietor, is an extensive breeder, the most extensive, I believe, in the Western Highlands, having from 150 to 200 breeding cows, from which he shews some excellent lots of cattle. On the Island of Giha, betwixt Islay and Cantire, some first-rate kyloes were bred by Mr M'Neil, the late proprietor, who shewed at Dumbarton fairs one of the best lots from that quarter. There are good lots bred in the small islands of Scarba, Luin, Suel, Shuna, and on the mainland in Argyll, in Cantire, Knapdale, and Lorne. Mr Malcolm of Pottalloch, in Knapdale, on the Crinan Canal, has a very superior stock. I have seen his stock of beautiful cows, above 100 in number, and also sixty three years old oxen, very fine fat, about forty-five stones each, which had been wintered on hay and grass, without turnips. They were sold at Dumbarton Fair, in the June following, at L.14 a-piece, when they had evidently lost condition during the winter. The summer grazing of the West Highlanders is much superior to their winter keeping. I have seldom seen so fine a lot as these were, in the August I saw them, when they were grazing in a grass field of about eighty acres. On this gentleman's property are 1000 acres of improved land, which must have incurred great expense to bring into cultivation. Several hundred acres had been reclaimed from the common moss, which now carry as fine pasturage as perhaps any where in Scotland. The farms and cattle in Mr Malcolm's own hands are managed in a very superior manner. I observed a very fine lot of four years old oxen wintering in the wood of Bunaw, belonging to the Bunaw Company in Argyllshire. Frost continues but a short time, and but little snow falls in this part of the country. Rain, particularly in autumn, is the principal atmospherical infliction, and against such the shaggy coats of the kyloes are an admirable defence. The aged cattle are almost all wintered in the fields and woods, and in January I have observed them grazing in the Island of Mull, as if it had been in summer; and what appeared extraordinary to me was to see them feeding within water-mark of the tide, on sea-ware. They are extremely fond of a particular species of sea-ware, which is said to be of benefit to them in winter. The pasture on some of these islands, particularly the Strishnish Islands, is as fine as that in gentlemen's lawns around their mansions, and it continues green all the year round, the snow lying but a few hours at a time, and the temperature always favourable to vegetation. Colonel Roderick Macneil, of the Island of Barra, has long possessed, and still possesses, one of the truest bred stocks in the Western Isles.

Some fine West Highlanders may be seen about Inverary or Lochfine. The Inverary variety of kyloes bred by the Duke of Argyll, were once famed. In Perthshire Lord Balgray has shewn some fine lots; and Lord Lynedoch has frequently shown fine lots in Perth markets from Balgowan. A friend of mine one year at Midsummer market, at Perth, bought ten such from Lord Lynedoch. They were black, with white horns, and were great beauties. After being fed the following winter, they were taken thick fat to Glasgow market, in April, when they were pronounced to be the handsomest lot of cattle that had appeared in it for some years. Sir Niel Menzies of Castle Menzies is a spirited breeder. He obtained the Highland Society's premium, at Inverness, in 1831, for the best pair of West Highlanders. The late Mr Donald Stewart of Auch used to shew fine cattle. On the Breadalbane estate in Argyllshire, Mr Mackay, Ardmady, has a fine stock. Adjoining Ardmady is the farm of Dignish which was sometime occupied by Mr Colin M'Nab, and when his stock was sold off some years ago, the cows fetched twenty guineas a-piece. The present tenant of Dignish, Dr Maccallum, in 1828 sold a bull two years old to Mr Macdonald, Fort William, for eighty guineas. On the farm of Burravourach in Glenorchy, Mr Thomas Waters has also a good stock. Mr Lorne Campbell, chamberlain to the Duke of Argyll, has also capital stock. Mr David Skirving of Garleton, in East Lothian, shewed two superior dun oxen, which he had bred and fed, at the Highland Society's show in Edinburgh in 1827, and obtained the first prize for the best pair of West Highland cattle.

The mothers of these oxen were two dun cows, purchased in calf, at Doune fair, by Mr Hutchison, at Haddington, for Mr Skirving, from Mr Peter M'Intyre, then in Glenartney, on the Drummond estate, belonging to Lord Willoughby d'Eresby. Both produced bull calves; and, as they were from the stock of a first-rate breeder, they were castrated, and resolved to be kept till 1827, to be shown at the Highland Society's meeting in Edinburgh; and he succeeded in his wish, thereby proving that true blood may always be relied on to produce its like. They were purchased by Mr Thomas Taylor, flesher in Edinburgh, along with other two crosses, for L. 170, and Mr Taylor resold one of them to Mr Little Gilmore, before it left the show-yard, for L. 50. It was to be sent to Sir James Boswell of Auchinleck, on the occasion of his coming of age, to be roasted whole. Mr Taylor slaughtered the other, and it produced seventy-four stones of beef the four quarters, and fourteen stones of tallow. The current selling prices of the best West Highlanders at Dumbarton, are from L. 12 to L. 14 for four, and from L. 10 to L. 11 for three year olds.

One of the finest points possessed by West Highlanders is their fine coat of hair. This is an essential point for a breeder to consider. A good coat is a great safeguard to cattle twice a-year, in spring and autumn. Cattle which have been well kept during the winter, and turned out in the spring on pasture on cold bottomed land, or in cold wet clays, will assuredly be affected for some weeks after, with a catarrhal fever, if they are not protected with a good covering of hair. In like manner, a good coat is an excellent protection in nights of early frost, or rainy days in autumn. An animal with a poor coat affected under these circumstances, will cease moving about in search of food. He will stand under some sheltered spot, with his four feet drawn together, his back raised, his eyes dull, and probably watering, and grinding his teeth. On the other hand, he with the shaggy coat will move about, keeping his blood in circulation, and exciting the animal heat by filling his paunch and promoting digestion, regardless alike of the rain or the hoarfrost, when it drops from his sides, or sparkles on the points of his hairy covering. Improvement of the hair promotes improvement of the hides of cattle Thin silky hair will always be found to cover a thin papery hide. Long soft mossy or downy hair springs from a thick soft hide, smooth and pleasant to the touch, like chamois leather. Such hides make the best leather for shoes and harness, and will realise the highest price in the market. This point regarding the hide is too much neglected by breeders.

The smaller sized West Highlanders are very useful to many south country farmers, who purchase them rising two and sometimes three years old, to graze on poor moor lands growing coarse grsss. Many thousands of them are bought at the Falkirk trysts, and other fairs, such as Doune, Dumbarton, and All Hallow, for that purpose. Part of the grazings are left rough for them in winter; and, in severe weather, they are provided either with hay or straw on the ground, and, in some instances, turnip, with liberty to retire into shelter at night, if they choose. Where they have proper sheds to eat their turnips in, they thrive in this way most rapidly. After two winters and a summer's keep, they will attain the weight of from thirty to forty-five stones, according to the age. They always meet a ready market from retail butchers, being admirably adapted to summer killing; and feeders generally contrive to have them ready to suit the warm weather. The greatest objection to these animals being at all put into a straw-yard to feed is their restless jealous disposition, which makes them too desirous to fight with or attack one another with their sharp-pointed ready-set horns. The most profitable way is to forward them on grass as much as possible, as they are most excellent grazers. The smallest sorts are called in some parts of England, "bog-trotters," which will get fat on rough coarse herbage, where no other breed can. I have seen very fat lots of them fed on high coarse pastures. A lot of twenty was lately sold by Mr Symon Hunter, of Guardmoor, one of the highest farms on the Lammermoor Hills, to Mr John Plummer of Edinburgh, at L. 16 a-piece.

As a striking instance of what the West Highlanders, bought in this way, may attain to, I may instance the very fine dun ox shewn by Mr Spearman of Wharton, near Rothbury, Northumberland, at the Show of the Highland Society at Kelso in 1832. This ox was bought among a large lot at Falkirk, which cost L. 4, 8s. each, then six quarters old. The next year he was observed to outstrip his companions in size and condition, and to encourage his natural aptitude to fatten, Mr Spearman fed him afterwards with superior food. In 1834 he was slaughtered, and yielded the extraordinary weight of 152 stones 8 lb. the four quarters, and I believe nearly 20 stones of tallow. His price was eighty guineas.

Had the breeder of this ox been aware of its very superior properties, he would certainly never have made him an ox. The value of such an animal as a bull would have been incalculable. Mr Spearman has frequently bought superior lots of West Highlanders, out of which he has selected particular animals, and fed them from 80 to 100 stones.

## IX. THE AYRSHIRE BREED.

This breed originally arose in Ayrshire, the county which gives its name to it. It is not a very old breed, but the exact period at which it was distinguished as a separate one, and by what means it was first established, is not well known. But however it originated, it is certain that it attained a high character as a breed eminently fit for dairy purposes. Indeed, it is no uncommon thing to hear it asserted that the Ayrshire cows are the best milkers in the kingdom. That this assertion is strictly true I am inclined to doubt, but I cannot doubt that they have somehow acquired that character, and that is sufficient proof or warrant with many to furnish their dairies with them; and being thus impressed, they live happily under the idea that they possess the best class of cows for dairy purposes that can be found. A gentleman of my acquaintance once had the misfortune to excite the ire of his friend, who prided himself on his stock of Ayrshire cows. They were certainly neat animals, but small, and had, no doubt, cost him a handsome sum of money. He happened to suggest that, on his rich pastures, if milk and butter were his only objects, that a smaller number of well bred short-horn cows would yield him as much milk and butter as all his Ayrshires. He looked incredulous. It was explained to him that the larger breed would individually consume more food, and give him, in return, more milk, and that he would thus incur fewer risks of death in his stock. He appeared not to be satisfied at the time with this explanation, but it nevertheless shook his faith in Ayrshire cows, and at length he tried a few short-horns; and when he found he could sell his short-horn bull-calves, and queys in calf, at large prices, and at a ready market, he fairly jilted the Ayrshires. The truth is, the Ayrshires have been too much bepraised as milkers. Let us observe the practice of those who make their livelihood by the disposal of dairy produce, and we will find that they do not prefer the Ayrshires as the most profitable milkers, but generally purchase the short-horns. The large dairies in London are almost all filled with short-horn cows, they being the favourite on account of their profitableness. In Liverpool it is the same; and the dairy farmers in Cheshire now prefer them. The large Caledonian Dairy at Meadowbank, near Edinburgh, began with a stock of many kinds of milch cows, but soon found that the Tweedside short-horn cows were the most profitable. The reason for the choice is obvious. Individually the short-horn cows are much larger than the Ayrshire; they consume more food, is true, but not more in proportion to their size; but they give more milk, take up less room, and give less trouble in proportion to the quantity of milk which they give.

The external characters of the best of the Ayrshire cattle are, a straight and nearly level back, the top of the shoulder being a little below the level line, and there is an evident tendency to depression over the loins. The ribs are pretty round, and the body deep; but there is a deficiency in the filling up of the buttocks. Viewed from before and behind, the carcass is rather narrow, particularly before; viewed from above, the shoulder is much narrower than the hooks, which gives the body a considerable wedge-shape, and the top of the shoulders a sharpness. The legs are short, and the body looks long for its height. The muzzle is fine, the face broad but rather short, the eye complacent, and the horn short and turned upwards, though not gaily. The expression of face, though gentle, is rather unmeaning. The colours are red and white like the short-horns, though not so rich, and mixed in some instances with black; but they are arranged in irregular blotches and patches, which are seldom round, and never grizzled. The skin is smooth and thin, and the handling, though good, wants the mellowness which a thick soft skin possesses. The thinness of the skin, and fair handling, indicate a disposition to give milk, and a tolerable feeder. The beef is well mixed, and of good quality, but Ayrshire oxen never die well to the butchers. Few Ayrshire cattle are kept to be fed, the bull-calves being fed for veal, which is excellent, and much of it reared in Strathavon, in Lanarkshire, and the quey-calves are kept to renew the cow stock. The breed, in its uses, is therefore altogether confined to the dairy. The best Ayrshires are found in the district of Cunningham.

The Highland Society's Show at Ayr last autumn (1835), brought out a large display of Ayrshire stock. There were milch cows, queys, and young and aged bulls. They were all in fair keeping condition; but it could not fail to strike a stranger that all their breeding animals were very small. They all bore the characters of a small dwarfy breed, wanting substance and strength. Whether the Ayrshires were ever larger I cannot say, but when the best stock of the country wanted size, it is certain that breeders must, at least at present, prefer small breeding animals. The want of size and strength are of themselves sufficient characteristics to cause strangers doubt the great dairy powers which the Ayrshires are said to possess. For my part, after seeing them at Ayr, I was very much inclined to the opinion of them, expressed at the show, by an eminent breeder of shorthorns,—"that the Ayrshire cow was only fit for cottars or moorside farmers, and not for the large farmer." There were but few fat Ayrshire oxen shewn; all were good beasts, but there was so much difference of symmetry and general appearance between them, that it was difficult to ascertain which was the true breed, and whether there was a dash of other blood in them. The best ox of them all, in my estimation, appeared the likest to a shorthorn. But I may mention, that a large dairy farmer in Ayrshire confessed that Ayrshires were now getting too small, but that those exhibited at the Show at Ayr were not the best stock of the country.

I have heard it asserted by persons whom I otherwise consider intelligent judges of stock, that the Ayrshire cows owed their milking properties to the wedge-shape of their bodies, that is, while they are wide behind, and capacious for the formation of milk; they are narrow in the shoulder and chest. They are certainly wedge-shaped, as I have already stated; but this appears to me an extraordinary reason, at least an unsatisfactory one, that they should *therefore* be good milkers. That a wide hook, a broad pelvis, and deep flank are essential requisites in every good breeding-cow, every one knows. This conformation is absolutely necessary for the proper enlargement of the calf, and the convenience of a large udder. This peculiar conformation is desirable for a good breeder and milker of every breed of cattle. Where there is naturally an abundance of food, an abundance of milk will naturally be looked for; and, to shew that Nature is not inattentive to this relation, she produces the young large in proportion as the mother is large, in order to consume the large quantity of milk; but these circumstances have no regard to the narrowness of the chest, which confines the play of the lungs, nor with a sharp shoulder, which is only necessary to animals of speed. But as a decided proof that the milking properties of cows have no relation to the breadth of their shoulders, I need only instance the case of short-horn cows, which are capacious behind, produce large calves, yield a great quantity of milk, and yet have broad shoulders and wide chests.

But, after all, the best breed for dairy purposes must be decided, not by reasoning, nor by references, but by obtaining the great object for which it is desired—namely, profit from dairy produce. One should think that that breed which returned the largest produce for the same quantity of food would be the most profitable. Where sweet-milk alone is disposed of, this criterion would be strictly applicable; but where butter is desired it might not be applicable. We have already seen that milkmen prefer short-horns, but so do the butter-makers in Cumberland; but the butter-makers in Clydesdale prefer Ayrshires. But it may desired to dispose of cheese instead of milk and butter; and, for this purpose, the cheese-makers of Ayrshire prefer the Ayrshire cows; but we have seen that the cheese-makers in Cheshire prefer short-horn cows. So that different ideas must actuate milk, butter, and cheese makers in different parts of the country. The quantity of milk said to be given by Ayrshires has certainly been exaggerated. Some writers have stated it at 2000 Scotch pints (1000 gallons) a-year from one cow. Perhaps a few cows might yield that quantity, but from what I have heard practical farmers say, that from 1000 to 1500 pints would be nearer the actual quantity. I have known many short-horn cows give twelve Scots pints (six gallons) a-day for several months in summer, and I have known of another, a cross between a Galloway cow and short-horn bull, belonging to a steward of a farm in Berwickshire, which yielded twenty pints a-day during the best of the season, and she had to be milked five times a-day to keep her easy. She would regularly come at the appointed time to the gate of the field to be eased of her burden. These are remarkable instances; * but 10 pints (5 gallons) a-day for the whole summer is no uncommon produce of milk from a short-horn cow. I am also inclined to doubt the quantity of butter which Ayrshire cows yield, as stated by some, at 257 lb. or at the rate of nearly 5 lb. a-week all the year round. I have known of a very small Angus cow give weekly, during the best of the season, 9 lb. of butter; and a calf of hers, got by a short-horn bull, when a cow, yielded 12 lb. of butter a-week; but these, again, are rare instances. I suspect from 190 lb. to 200 lb. altogether in the year, or 3¾ lb. or 4 lb. a-week, all the year round, would be much nearer the ordinary quantity, and that is a good gift.

The Ayrshire breed has spread over a large extent of country, in the counties of Ayr, Lanark, Stirling, and Renfrew, completely; and partially in Dumbartonshire and West Lothian; and, I believe, Wigton; besides being scattered in small lots over most of the lowland counties of Scotland.

## X. The Galloway Breed.

There is no county of the name of Galloway, that being the designation of a district of country comprehending the counties of Wigton and Kirkcudbright. The Galloway is a polled breed, though some years ago many of them were horned; but the polled being the less likely to injure one another in the drove,

---

* I may mention a remarkable instance of precocity in the giving of milk, in a quey from this extraordinary milker. The quey, when two years old, before it had taken the bull, or had ever seen a bull, for there was none kept on the farm it was bred, dropped an udder and gave milk. The owners thought some disease had affected the udder when they saw it enlarging, but on endeavouring to rub it and strip the teats, with a view to relieve it, pure milk came, and continued to come all summer, as abundantly as if the quey had borne a calf.

the horned have been gradually wed out. Sometimes yet a small horn is exhibited, attached only to the skin. The Galloway is a symmetrical useful breed of cattle. The back is quite straight and level, at least the top of the shoulder stands more to the level than in the Angus breed. The ribs are well rounded, and the quarter is longer than in the Angus, which makes the loins short coupled. The body is deep, the brisket being well forward, and the buttocks well filled down to the hock. On being viewed before and behind, the body is broader than the Angus, the buttocks being round, the back across not flat but rounded, and the body wide across the brisket. Viewed from above, the breadth of the hocks is carried forward to the shoulder more than in the Angus. The head is rather large, and looks coarse, though it is finer set on the neck than the Angus. The muzzle is not fine, the eye dull, shewing no white, and indicating sulkiness; the ears thick and hairy, and the crown of the head surmounted with a rather large round knob, tufted with hair. The colour is mostly black, with sometimes a line of a dull dusky hue running along the back. The legs are short and strong, and few breeds carry the beef so near to the heels as the Galloway. The skin handles kindly, and is well protected with soft longish hair. The beef, when well and long fed, is of first-rate quality, fetching the highest prices at Smithfield. The whole carcass shews great substance, and indeed I may say that no cattle bred in Scotland shows more substance than the Galloways; the beef being placed mostly on the back and hind quarters, the most valuable parts of a fat ox.

The Galloway, as I have already observed, has been crossed with the Angus to improve it, and now the best Angus are as good as they; they are indeed scarcely distinguishable. It would require a very good judge of both to distinguish them. Both might, and do, mix in the same drove in England, and are sold together, and denominated Galloways. But the general run of the Galloway cattle is better than the Angus. They are more like one another, shewing a greater purity of blood, and were a single beast run off the lot, it would be a fair sample of the rest, and the sample would be a good one. The same properties could not be observed in the case of the Angus. I have also said that the Galloways are like the Buchan doddies.

but they scarcely attain to the weight of them, though they are of finer quality. The former cut up beautifully with the retail butcher, the latter is better adapted for strong ship beef.

Few Galloways are fed in the land of their birth, being driven away at two and three years old to the pastures of Norfolk and Suffolk, to be purposely fed for the Smithfield market, where they pass under the name of Norfolk Scots. From March to July fully one-third of the cattle in Smithfield are of this description. They are much liked by the London butchers, being admirably adapted for cutting up when thick fat, or "*hard fat*," a term indicative of an animal of fine quality. But I do not think that they arrive at early maturity, as they do not get ripe till four years old, except when extra fed.

The best queys in Galloway are kept for breeding cows, the rest are spayed, and sent along in droves with the stots. The spaying used to be delayed till the queys were a year old, but now it is generally performed a few months after their being calved. These spayed heifers never attain to the size of the stots, but, like all heifers, come earlier to maturity, and produce beef of the very finest quality. The Galloways not only occupy Galloway proper, but the southern portion of Ayrshire, and a considerable part of Dumfriesshire. As I have already remarked, they have been taken to Forfarshire to improve the Angus breed, but few of them are now to be found in that county in a pure state. Galloways are kept in a pure state in Sutherlandshire, by Mr Alexander Craig of Kirkton, near Golspie, on that tract of land lying between the Little Ferry and Golspie, which has been lately so much improved by Mr Craig, Mr Sellers, and others. Some years ago, Mr Craig got a few cows and two bulls from Galloway, which he has since increased to a stock of from fifty to sixty breeding cows, which I have seen, and I must say that I never saw a lot of Scottish cows, which I admired more. They are very like one another, and showed excellent symmetry, and some fine points. I saw them in August, when they were in high condition, almost fit for the butcher. They were stated to be fair milkers. They seemed suitable to that part of the country, and they inspired their proprietor with confidence in the breed. I recollect of Mr Craig selling a lot of three-year-old Galloways, to Mr Brown of Linkwood, a distiller near Elgin, for L. 11 a-piece, the price of cattle being low at the time. They were fed on distillery offal to April, when Mr Brown was bid only L. 14 a-piece for them. He preferred driving them to Aberdeen, and sending them on consignment by steam to a Smithfield salesman, who obtained L. 19 a-piece for them. After deducting L. 3 a-head of expenses, he still got L. 2 a-head more than he was offered at home. But, it may be observed, that Mr Brown being a malt distiller, the offal was much inferior to the offal of raw grain. Mr Craig showed some of his Galloway stock at the Highland Society's Show at Inverness in 1831, which were much admired, and gained a premium. A few of the three-year-olds were purchased by Mr Dalgairns of Ingliston, in Forfarshire, for about L. 21 each, and were afterwards sold by him in January 1832, in Glasgow market, for 25 guineas a-piece. They were very superior oxen, and supposed to weigh fully 70 stones each.

These which I have now but shortly noticed, comprehend all the principal breeds of cattle in Scotland. As my intention was only to describe Scottish cattle, I shall not attempt a minute description of those in England, particularly as there are many there whose characters I have never had a proper opportunity of studying. My determination is to say nothing of live-stock at all but what I know from my own observation and experience; and as long as I adhere to this rule, there can be "no mistake." But as the largest portion of our Scotch cattle go to England, it may be interesting to know in what parts of England they are chiefly to be found; and as many cattle from Ireland now find their way to this country, and as I have seen a considerable number of all kinds in Ireland, a few words upon their characters may not be irrelevant.

The Short-horns have spread themselves over the counties of Northumberland, Durham, Westmoreland, York, and Northampton. They have partially obtained footing in Cumberland, Cheshire, Lincolnshire, Norfolk, and Suffolk, and in several of the midland counties. Numbers of them are sent from Lincolnshire, under the name of "Lincolns," to the London market. They had been purchased in the northern counties, and fed off on the deep moist pastures in that county, where they attain to great size and heavy weights. The dairies in all the largest towns in England are supplied with shorn-horn cows, as being the steadiest milkers, and afterwards the best feeders, of any breed. The Galloways, Angus and Buchan doddies, find their way in droves to Norfolk and Suffolk, where they are fattened for the London market. They are much admired, and fetch the highest prices. The North Highlanders occupy the coarse and upland pastures in the elevated lands through the middle of England, Northumberland, and Yorkshire; and many pass into Wales. And the West Highlanders are to be found grazing in the low pastures of the midland counties, particularly Leicestershire, as far as the neighbourhood of London, and to the east and west of that line in most of the lowland pastures. They are great favourites in the country markets in England, and, along with the North Highlanders, make excellent cutters up for summer killing. Such is the dispersion in England of the different breeds raised in Scotland.

## XI. English Breeds.

In regard to the breeds peculiar to England which I have seen, I admire the Herefords the most, because they show, when fat, symmetry and points the nearest in resemblance to those of the short-horns. Their colour is red, with almost always much white in their faces, and some are white backed. Their horns are white, and longer than the short-horns. They carry the beef well on the back, and although a heavy breed, they generally sell at the top price at Smithfield. I have seen some beautiful lots of them shewn there about Christmas. The Hereford cow being, however, a very bad milker, and the calf consuming all the milk, this breed of oxen must be less profitable to the breeder than the short-horns. The Herefords pay the feeder better than the breeder.

The long-horns occupy several of the midland counties of England, particularly in Lancashire. They are mostly of a dark red colour and brindled, with white along the back, and long, spreading, and sometimes drooping horns. They have good coats of hair, fair symmetry, having the back well covered with beef, and get to great weights; but they are rather coarse in the bone. They are good grazers, and pretty well liked by feeders, but still the Scotch cattle are preferable as grazers. The late Mr Bakewell cherished the long-horns in preference to all others, and maintained their superiority; but experience now generally awards the palm of merit to the short-horns.

The Sussex cattle are a large breed, generally of a red colour; with no white upon the face, but having larger horns, plainer skins, larger bone, and being deficient in symmetry, points and quality, when compared with the Herefords. They are well adapted for the shipping line, and are frequently bought by the shipping butchers, while the Herefords are purchased by the cutting up butchers, who always give the highest price for the best quality.

The Devons have a pure rich red colour, with white horns. They possess fair symmetry and points, and, consequently, are of middling quality; but not equal to the Herefords as cutters up. Some of them have been tried in Scotland, but they do not seem to take in that country. I have seen them grazed along with short-horns, and had no chance with them as feeders. I have also seen them killed; they are fleshy, but want that fine mixing so common in Scottish cattle and short-horns. They are prized in some parts in England, as in Devonshire and Norfolk, for yielding richness and quantity of butter. It is certain that very little agitation causes the cream to pass into the state of butter. Lord Lynedoch imported a large lot of North Devon cows from Mr Coke of Norfolk a few years ago. Some of them, on being exposed to sale, found no purchasers. Devons are also favourites in some parts of England for the draught. They have been tried in Ireland, particularly in the county of Mayo, where several breeding stocks are kept. There they are small, but the beef is better than that of the native Irish cattle. They have probably been imported from *North Devon*.

The Suffolk cattle are all dun coloured, and they very nearly resemble the Angus in external characters. The cows are said to be greater milkers than the Angus, but no wonder when one observes the superior pastures of Suffolk. Very few oxen of the duns are fed fat, the bull calves being fed for veal, and the cows purposely kept for making butter for the London market; hence the proverbial poverty of the Suffolk cheese.

The Welsh cattle resemble the smallest and coarsest sorts of our Fife and Aberdeenshire runts, having thick horns, thick coarse plain hides, and narrow backs, and, in my opinion, they are a very inferior breed of cattle. This is the description of many which I have seen fat at Smithfield, and lean at Epping Forest and Rumford markets. They appeared, however, very like one another, which is a proof that no intermixture of blood exists in them. But graziers and feeders out of Wales (for in that country the prejudice in favour of their own cattle exists in a very strong degree), who can find Scottish West Highland cattle, never think of buying Welsh. The agriculture of Wales being far behind most parts of the kingdom, inferior cattle may be expected to accompany inferior husbandry.

## XII. Irish Breeds.

The native breeds of Ireland deserve a separate notice. There are apparently three breeds of cattle in Ireland: one inhabiting the mountainous parts, and being of small size, and commonly called the Kerry Breed; another, a small but larger breed than the former, to be found chiefly in the north of the island; and the third is to be found in the low rich plains in most of the midland and southern counties. The two last are evidently both long-horns, but they do not appear to have had a common origin.

The Kerry breed is as small, and not unlike the Skibos of Ross-shire. They have small bone, sharp muzzle, quick piercing eyes, long sharp-pointed horns turned upwards gaily at the points, fine hairy coats, and are as wild as hares. When let alone they are quiet enough, but if the least irritated or raised no fence can contain them. They are great milkers for their size, and on that account the heifers are in constant demand, fetch good prices, and make a good poor man's cow. In this latter respect they are like the Ayrshire cows. Droves of Kerry heifers may be met with in many parts of the low country, ready to be disposed of in lots of one or two to small farmers and families in towns who keep cows.

The cattle in the north of Ireland are a shapeless inferior sort. A few of a symmetrical shape may be occasionally seen, but the generality of them are certainly worthless, and I should conceive dull feeders. They have large heads, long horns, coarse bone, coarse thick hides, of every variety of colour, but mostly white on the back, with dewlaps, and the body is quite thin when viewed before or behind. Large droves of them, three and four years old, are weekly exported to Liverpool, as grazers in England, of the value of L. 5 a-piece. I was informed by the owner of a steam-packet at Warrenpoint, near Newry, that eight hundred head of them per week, for sixteen weeks, had been shipped from that port to Liverpool alone. The freight was 15s. a-piece. Many of the heifers are in calf, and frequently bring forth their young on board ship, so ignorant are dealers of their existent condition, and so careless are the breeders of the promiscuous intercourse between the sexes.

The breed of the plains, with long horns, is a large and valuable breed. They have straight level backs, strong bone, thick and rather hard hides with plenty of hair, placid eye and countenance, great substance with thick shoulders, short coupling, and backs well covered with beef. Their colours are various, mostly red and white, coarse ugly roaned, with white along the back. When fat they are much liked by the shipping butchers. Liverpool and Manchester fat markets are almost wholly supplied with them; but the finest description of them are to be seen in Smithfield market, Dublin. The quality of the meat is middling, strong in the grain, but juicy, and the flavour is always pleasing. As grazers in England, they are never preferred to the Scottish cattle, but in their own deep land pastures and moist climate they feed very quickly. It is perhaps owing to fast feeding that the grain of the flesh is larger, and it is this property which makes the meat take so well at Liverpool for the shipping. Many are also sent fat to the Glasgow market, where the heavy parts, such as shoulders and rounds, are salted for hams, that city having long been famed for beef-hams. The hides of these cattle, on account of their thickness, give 0s. to 20s. a-piece more than the hides of short-horns of the same weight. Upon the whole, they are a useful breed of cattle, but they have not the fine quality of the Scottish Galloways or West Highlanders, which take so readily in London. But the Irish cattle can be brought to great weights. I saw a lot in a Dublin market of five year olds, which were estimated to weighed 0 stones each, and were sold for L. 32 a piece.

I consider the price of cattle fully as dear in Dublin as on the borders of England and Scotland. A lot of cross heifers, of about forty stones each, sold for L. 12, 10s. each, and at the time they would not have brought the same money in Edinburgh or Morpeth. The best beef in either of these markets did not exceed 6s. or 6s. 3d. the imperial stone, that being in the beginning of April. At that time the grass was so fine round about Dublin, that I saw a large lot of cattle grazing in the Phœnix Park. On returning to Scotland a few days afterwards, there were few symptoms of vegetation. But indeed, throughout the whole midland and southern counties of Ireland, such as Meath, East Meath, Tipperary, Kilkenny, Carlow, Limerick, Leitrim, Roscommon, and other counties, the pasture to Scottish eyes is indescribably good. I have often thought, and not without a feeling of envy, that were such pasture in Scotland, or were Scottish farmers and their stock in Ireland, what a mine of wealth might not that country become to the whole kingdom! But it is impious to indulge in impossible wishes.

The Irish beef being strong in the grain, stands the salt, and is therefore well adapted for the supply of the navy. During the war, salting of Irish beef was carried on to a very great extent. Much chicanery, it is true, was practised by the contractors for beef upon the feeders of cattle, who were principally the small farmers, and it was lamentable to hear how they were duped and cheated; yet a similar disposition is frequently shewn by the latter, under unprovoked circumstances, to poor labourers who were under their power, that our pity for them strengthens into a satisfaction that they had received retributive justice from superior hands. Such is the prevailing desire to overreach one another among the lower orders in Ireland, that until their moral habits are raised to a higher degree, no peace can be ensured, and no confidence established, in that country. Many of the most fearful contentions amongst families have entirely been engendered by moral turpitude.

## XIII. ISLE OF MAN BREED.

The cattle from the Isle of Man might be expected to be a sort of distinct breed, because we frequently find that where little intercourse takes place between an island with the mainland, the cattle on it naturally assume the characters of a distinct breed. They become like one another, and shew that they have had a common origin, like the West Highlanders in the Isle of Skye, formerly alluded to. With these ideas in my mind, I was anxious to see the cattle of the Isle of Man, but what was my astonishment when I beheld in them the most mixed breeds I ever saw, particularly in a cargo which arrived in Liverpool as I was one day waiting at the Brunswick Docks the arrival of a vessel with cattle from Ireland. They beggar description. I was impressed on seeing them that the worst cattle of all breeds and colours and shapes had been collected together. There was not one good beast amongst them. To satisfy my curiosity about the value of them, I asked the price at the owner; he answered, L. 8 a-piece. I should have thought them dear at L. 5, although they were all above three years old.

## XIV. Alderney and Jersey Breeds.

A few cows of the Alderney and Jersey breeds are to be seen in Scotland, kept as dairy cattle for supplying butter to gentlemen's tables. Their milk is certainly very rich, and the butter is equally so; but the cows are not adapted, in my opinion, to this climate. They are mostly of a light brownish-red colour, mixed sometimes with white, and sometimes with dun and white, with short horns, and have a timid cast of countenance. Their hair is short and smooth, and the skin very thin and papery. When viewed from behind, their body appears like two boards nailed together, "as thin as a lath."

## XV. French Breeds.

I have seen some French cattle. They are not unlike the Guernsey breed. They are ill made, but give excellent milk, and get very fat on the rumps, but they are always thin on the ribs, and the beef is generally of a yellow hue.

# BIOGRAPHICAL MEMOIR OF THE LATE RIGHT HONOURABLE SIR JOHN SINCLAIR, BART., FOUNDER AND FIRST PRESIDENT OF THE BOARD OF AGRICULTURE, &c. &c. &c.

From the days of Cato the Censor, down to those of Curwen of Workington Hall, there is no greater name in the annals of Agriculture than that of Sir John Sinclair. This praise may at first appear startling, but the more the matter is examined, the less reason will appear for our language being considered that of exaggeration. Were it possible to throw ourselves back to the commencement of the last half century, and accurately to examine the situation of rural affairs at that period, and then to contrast the present with the past,—what we now behold around us, with the situation of our ancestors fifty years ago,—we would have not only ample cause for satisfaction, but for astonishment. What, within nearly the same epoch, medicine owed to Cullen, chemistry to Black, and steam to Watt, agriculture owes to Sir John Sinclair. To his active mind may be traced the germs of a thousand improvements, of which others claim the practical merit, and of which the world at large is at this moment reaping the advantage. What was a collection of mere isolated facts, he formed into the elements of a science. He classified and arranged; shewed what was still wanting, and suggested the most probable means of supplying the deficiency. From a chaos of jarring opinions he educed beauty, harmony, and order; and from the comparison of data, established a system of practical inferences. Nor was he a speculator at the expense of others. He commenced with his own estates. Where he failed he was the sufferer in his own property; but where he succeeded, the way to improvement and prosperity was immediately laid open to the public. Nor were his speculations confined to mere farming—to the art of extracting the greatest quantity of marketable produce, from a given extent of the earth's surface. His object embraced the general prosperity of the human race. He took into primary view the advantages and disadvantages of geographical situation; the healthiness and longevity of the inhabitants; the classes of the population; and the reciprocal influence of agriculture, manufactures, and trade upon each other, both in relation to commercial prosperity, and to morals and religion. In the prosecution of this great and engrossing scheme for ameliorating the condition of humanity, no man of any age or country has devoted more labour, or that labour more successfully, than the late Sir John Sinclair. Nay, the word *Statistic*, a word now in every mouth, and which is pregnant with such a mass of implied information, had not even an existence in the English language, at the commencement of his career.*

The subject of the following biographical sketch was the representative of a principal branch of one of the oldest and most nobly descended families in the north of Scotland. The surname of Sinclair, or De Sancto Claro, is originally from France. Waldernes, Compte de Saint Clare, having married Helena, daughter of the Duke of Normandy, cousin-german of William the Conqueror, crossed over with that prince in 1066. His son William, a youth of distinguished merit, soon afterwards came to Scotland, and was well received by Malcolm Canmore. He became steward to Queen Margaret, and received, as a reward for his services, the lands and barony of Roslin, as well as several others in the Lothians. He was the founder and head of all the Scottish Sinclairs; and the Ulbster family is one of the oldest and most important branches from the parent stem. They trace back their descent to the ancient Earls of Caithness, and have possessed the lands of Ulbster for upwards of two centuries.

---

* "Many people were at first surprised," says Sir John, in his History of the Origin and Progress of the Statistical Account of Scotland, "at my using the new words, *Statistics* and *Statistical*, as it was supposed that some term in our own language might have expressed the same meaning. But in the course of a very extensive tour through the northern parts of Europe, which I happened to take in 1786, I found that in Germany they were engaged in a species of political enquiry, to which they had given the name of *Statistics*; and, though I apply a different idea to that word, for by Statistical is meant, in Germany, an inquiry for the purpose of ascertaining the political strength of country, or questions respecting *matters of state*; whereas the idea I annex to the term is an inquiry into the state of a country *for the purpose of ascertaining the* quantum *of happiness enjoyed by its inhabitants, and the means of its future improvement*; yet, as I thought that a new word might attract more public attention, I resolved on adopting it, and I hope that it is now completely naturalized and incorporated with our language."—*Statistical Account*, vol. xx. p. 13, 14.

Even before the Union with England, it was of such weight as to have more than once represented the county of Caithness in the Scottish Parliament.

George, the father of the distinguished subject of this memoir, was the son of John Sinclair of Ulbster, the heritable Sheriff of Caithness, a gentleman distinguished for his spirit and talents. He received the principal part of his education under the justly celebrated Dr Isaac Watts; and enlarged his understanding and knowledge of the world by foreign travel, in company with Lord Sandwich, afterwards First Lord of the Admiralty, Lord President Dundas, and other distinguished characters, whose friendship and regard he ever afterwards retained. Dr Blair, Dr Robertson, and many others of the celebrated literati of the last generation, were in the circle of his intimacy. On his return to his native country, he married Lady Janet Sutherland, the daughter of William Lord Strathnaven, by whom, besides several children who died young, he had two sons and three daughters. John succeeded him in the family estates; and James, who had entered the army, died in early manhood. Of his daughters, Helen was married to Colonel Campbell of Barcaldine, in Argyleshire; Mary to James Home Rigg of Morton; and Janet to Lord Polkemmet, one of the Senators of the College of Justice.

Having died at Edinburgh on the 31st August 1770, he was succeeded by his son John, who was born at Thurso Castle, in the county of Caithness, May 10. 1754, and who was of course in his seventeenth year when he succeeded to the family property. The estate, during his minority, was taken charge of by his mother, Lady Janet Sutherland, as was also the superintendence of his education.*

---

* How estimable a parent Sir John Sinclair lost in the death of this lady, may be seen from the following letter, containing her last injunctions for his future conduct in life:

"My Dear Son, "Thurso East, *9th June* 1783.

"Before this can be delivered to you, I shall have bid a final adieu to this vain world,—to all its concerns,—and all my connexions in it. The death of an affectionate parent will naturally affect a son of your sensibility. I earnestly pray Almighty God to grant his choicest blessings on you, my dear son, your amiable wife, and promising children. May you always endeavour to serve God faithfully, and to worship him with reverence. May religion

Sir John Sinclair received the elements of his classical knowledge at the High School of Edinburgh; and he was also fortunate in receiving private tuition from the amiable and accomplished John Logan, who had been recommended to the family by his friend and patron Dr Blair. At a mature age he pursued consecutively his studies at the Universities of Edinburgh, Glasgow, and Oxford. It may easily be supposed that the varied modes of conveying instruction at these distinguished seminaries did not pass unnoticed by his observant mind; and that it suffered nothing, but gained much, from this diversified education. A more extensive acquaintance with the academical world was thus opened up to him; and he had an opportunity

---

and virtue be the rule of all your actions; and suffer not the temptations or allurements of a vain world to make you swerve from your duty.

"My settlement, of date 1776, which will accompany this, will give a striking proof of my attachment to you and yours. May the blessing of God accompany it. Your sisters I recommend to your affectionate attention. I hope they will merit it. Mrs Campbell has a large family, which she will find it difficult to educate and to provide for. Mrs Rigg is happily married to a good husband, and is in great affluence. My dear Jessy is happy under your and Mrs Sinclair's protection. I hope you'll be a father to them all.

"As to your own concerns, I entreat you to observe economy, and beware of impositions. Reside as much in Caithness as possible, and do not trust too much to the management of others in the conducting of your affairs. You'll find few to trust. Self-interest with some, popularity with others, you'll have to encounter. Even my long experience was not proof against their arts. Keep short accounts with those you employ in every capacity; and do as much of your own business and affairs as possible yourself.

"I don't approve of setting large tack (or farms) to tacksmen. They often oppress the poor people under them.

"To be in debt is a most disagreeable situation to be placed in. To contract it is easy, but how very difficult to repay. It lessens one's importance, chagrins the temper, and ruins a family. Beware of cautionry, and engagements for others.

"I have had a variety of trials and afflictions in life, with malice unprovoked,—*disrespect* and *indifference*. These I did not merit or resent, and I now *forgive*.

"Adieu, my dearest son, till we meet in another world; as I trust, in the mercy of God, and through the merits of an all-sufficient Saviour, that we shall meet in a state of bliss, and endless happiness, where the wicked cease from troubling, and where the weary are at rest.

"May you and yours be happy. God bless all my dear children, prays

Your affectionate mother,

"JANET SINCLAIR."

of balancing, in his own judgment, the merits of the particular systems then in vogue among the learned.

So early as his fifteenth year he had shewn a decided turn for literary composition, and before he was sixteen had begun sending his effusions to the periodicals of the day. Some of these boyish productions have been preserved, and do no discredit to the future man.*

On his return to his native country from Oxford, he applied himself to the study of law, not with the view of following it out as a profession, but to gain an acquaintance with the national institutions. In 1775 he became a member of the Faculty of Advocates, and was afterwards called to the English bar. The circle of his acquaintance was thus greatly extended, although we do not find, except in a few instances, that reciprocity of taste and talent continued to bind him, in after life, to the companions of his legal studies.

In the same year he made an excursion into France with his brother, Lieutenant James Sinclair, to whom he was most affectionately attached, and who was at that time in bad health. After visiting Paris, the brothers proceeded to Dijon, and thence by Avignon to Aix en Provence. The season, however, instead of being a warm one, was found by the travellers to be so inclement, that the object of their journey was in a great measure frustrated, and their sojourn at Aix was of short duration.

In 1780, Sir John, then Mr Sinclair, was elected Member of Parliament for the county of Caithness, where his estates are situated; and he had also the same honour conferred on him at the elections in 1790, 1802, and 1807; but as the county of Caithness was only alternately represented in the British Parliament, he was, during the intervals, chosen for the boroughs of Lestwithiel in Cornwall, and Petersfield in Hampshire. He thus continued, with the intervention of a very short interval, a member of the House of Commons, till July 1811, being a space of more than thirty years.

His attendance on his parliamentary duties was most assiduous and exemplary; and, in 1782, he published a tract, entitled, "Lucubrations during a short Recess; with some Thoughts on the Means of Improving the Representation of the People." From the attention it excited in the political circles, it called forth an answer from Lord Camelford, as well as from others, and must have been, in every respect, highly flattering to the feelings of the young author.* This he followed up by another, in the same year, under the title of "Thoughts on the Naval Strength of the British Empire, in answer to the late Lord Mulgrave, one of the Lords of the Admiralty." In this pamphlet the author explains the reasons, according to his own judgment, for the superiority of the British over the French navy. At this time the naval character of the country had been greatly depreciated; and it was said to have been maintained, even by Lord Mulgrave himself, that if a continental peace enabled France and Spain to concentrate their powers, they would prove more than a match for Great Britain on the ocean. After pressing on the attention of the Ministry the propriety of establishing a militia force, he published his "Considerations on Militias and Standing Armies;" and the suggestions which he threw out on that occasion were afterwards adopted in practice. His only other connexion with the press about this period, was in the publication of an anonymous tract, "The Propriety of Retaining Gibraltar, impartially considered." It was supposed by many at the time to have been the production of the first Lord Camelford.

---

* In Appendix A. to vol. xx. of the Statistical Account of Scotland.

Sir John Sinclair has been often heard to declare, that no circumstance connected with his Parliamentary career ever afforded him more entire and unalloyed mental satisfaction, than the success of a measure which he, about this time, suggested to the House of Commons, for alleviating the distress and wretchedness caused in the north of Scotland by a failure of the crops: Accounts from above a hundred parishes bear witness of the miserable state to which they were reduced. The cold and stormy summer of 1782 so fatally retarded the ripening of grain, that, in October, the oats and barley were still green. At the commencement of that month frost set in with the severity of an

---

* The first publication of Sir John, which we have been able to ferret out, was an 8vo volume, printed at Edinburgh in an earlier part of the same year, and entitled, "Observations on the Scottish Dialect." Never having chanced to meet with it, we can of course say nothing of its plan or execution.

Arctic winter; and, in a single night, laid the hopes of whole districts desolate. The frost-bitten grain became white, and the progress of ripening was at an end :—the garden produce, from want of sun, was destitute of its wonted nourishment; the turnip and potato crops were dwarfed and destroyed; the markets were nearly unsupplied, and what was brought for sale was of the worst quality. In some parishes the oats were cut out from amidst the ice and snow in the middle of November; and, in that of Mar and Dalarossie, they continued buried up till the February of the following year.

The oatmeal produced from this blasted and unripened harvest was dark in colour, and of an acid, disagreeable flavour—at once innutritious and high-priced. Many were compelled to kill their cattle, and eat their flesh without bread. The poor along the sea-coasts subsisted chiefly on whelks, limpets, cockles and other shell-fish. Numbers lived on nettles, of which they made a kind of coarse soup, and even snails were salted for winter provision.

This nearly utter deprivation of the meanest necessaries of life extended over several counties, and included a population of more than a hundred and ten thousand souls; and, indeed, the narrative of their sufferings, and of the shifts to which they were reduced to preserve mere existence, was liker those related of the shipwrecked on a desert coast, or of the generous enthusiasts of a polar overland expedition, than of a Christian community in a civilized land, and at their own firesides. By the force of his appeals, and his unwearied exertions in the cause of his suffering fellow-creatures, Mr Sinclair succeeded in getting the subject referred to a committee of the House. Although no precedent could be produced from the National Journals of any grant for a similar purpose, yet, in such a touching light had the case been set before them, that they voted an Address to the Crown, assuring his Majesty, that the House would make good whatever expenses might be incurred in the endeavour immediately to mitigate the horrors of such an appalling calamity. Nor could any thing be more gratifying than the result of this generous donation. The grant, so opportunely made in providing food for the hungry, was also, in a great measure, the means of removing the almost pestilential degree of sickness caused mainly by cold and deficiency of nutriment.*

It should have been mentioned that, in 1776, Mr Sinclair married Sarah, only daughter and heiress of Alexander Maitland, Esq. of Stoke Newington, in the county of Middlesex, a near relation of the Earls of Lauderdale, by whom he had two daughters, Hannah, since dead, who wrote the celebrated letters "On the Principles of the Christian Faith," and Janet, the wife of Sir James Colquhoun of Luss, Bart.

Towards the close of the American war, when the national prospects looked altogether lowering and gloomy, when the loyal were disheartened at the success of rebellion against the mother country, and when a spirit of disaffection and distrust hovered over the mass of the people, Lord Stair, Dr Price, and a number of other distinguished political partizans, added to this gloom, and fomented this discord, by maintaining that the finances of the country were irretrievably ruined, and that national bankruptcy must immediately ensue. To dissipate the cloud which had thus spread itself over the public mind, Mr Sinclair published, in 1783, his "Hints on the State of our Finances." In this pamphlet he triumphantly refuted the doctrines which had been so perniciously inculcated on the subject; and the excellent effects of his exposition were felt no less abroad than in Great Britain. So struck was Sir Joseph Yorke, then our ambassador in Holland, and afterwards Lord Dover, with the spirit and ability displayed in this essay, and of the sanatory change which it produced in the national mind, that he is said to have declared that "it ought to be printed in letters of gold."

From this publication, the authority of Mr Sinclair as a financier took its rise, and its popularity and success gave his opinion great weight with the monied interest of the country. The author was then residing at Brighton; and he was there waited on by Sir James Eisdale, then an eminent banker in London, for the purpose of his being consulted regarding the extension of the banking system in England, where it was then scarcely known. The plan, which Sir James submitted to him, was such as highly met his approval, and Mr Sinclair was the more able to speak of the advantages of it, from his knowledge of the benefit derived to the country from the Scottish Banks. Thus countenanced in his schemes, Sir James was immediately induced to put them into practice; and, before his return to the metropolis, he made the circuit of several of the English counties, where he established about twenty branch banks, in connection with his London house. Hence sprung the extension of the English banking system, and how much of its prosperity and power can be traced to this circumstance, need not be told to those versant with the trade and manufactures of the nation. But it seems necessary that time should be allowed to sanction improvements however palpable, before their beneficial operation is generally admitted; and hence, unfortunately, Mr Pitt could not be induced, notwithstanding the urgent application of Mr Sinclair, to require such bankers as issued notes to give security for them. The overlooking of this necessary check was the cause of much distress; inasmuch as needy adventurers circulated notes without the means of paying them, and in their insolvencies involved many, who had incautiously put faith in the stability of their credit.

---

* "Nor was it alone in the northern parts of Scotland, where this calamity was experienced. Even in Lauder, in Berwickshire, it was the end of December before the harvest was finished, after the greater part of the crop was destroyed by frost and snow. In the parish of Holywood, in Dumfriesshire, there was a heavy fall of snow on the 2d of November 1782, which covered the corn so deep, and lay so long, that it could not be cut for several days afterwards. Even in Ayrshire, the snow fell before the corns were cut down; the greatest part were in the fields, and much destroyed by frost."

*Vide* Analysis of the Statistical Account of Scotland, Appendix No. 3. to Chapter iii. p. 41.

In 1784 he applied to Mr Pitt for the grant of a baronetage, to which he had a claim, as heir and representative of Sir George Sinclair of Clyth; and, in 1786, this claim was acceded to, in his being created a Baronet of Great Britain, with remainders to the heirs-male of his daughters by his first wife,—a destination of which there is scarcely another example on record.

In this first section of his parliamentary career, Mr Sinclair came in contact with, and secured the friendship and correspondence of Lord North, afterwards Earl of Guilford, at that time Prime Minister; of the Earl of Sandwich, First Lord of the Admiralty; of Lord Viscount Stormont, Secretary of State for the Foreign Department, nephew to the justly celebrated Lord Mansfield; and the Right Hon. William Pitt.* In the great contest which took place between that distinguished and pre-eminent statesman, and his rival Mr Fox, in 1784, Mr Sinclair strained every nerve in his support, and so influentially, as to receive letters of thanks both from himself and from his confidential friend the Marquis of Abercorn.

In the year 1785 Mr Sinclair engaged seriously in inquiries on political subjects in general, and collected a great mass of materials from different sources. The first published form which part of these assumed, was in an essay "On the Public Revenue of the British Empire." In it he concentrated the essence of a vast variety of publications on the subject, and offered many luminous suggestions of his own. The work was subdivided into three parts, two of which at this time appeared, and the third in 1790. As, in the subsequent editions of this work, it assumed almost a new form, we must content ourselves with simply mentioning it at this period of his labours.

In the same year, Mr Sinclair suffered a sad domestic bereavement in the death of his wife. Indeed, so deeply was he affected, that he had almost resolved on retiring from public life, and resigning his seat for Lestwithiel, which had been procured for him through the medium of Mr Pitt. To soothe his mind, and alleviate the pressure of this deep affliction, he was induced to make a short excursion to Paris during the Christmas recess; and being there known, not only as a member of the British House of Commons, but as an author on financial and other political subjects, his reception in the French capital, at that period a place of great interest, was in the highest degree gratifying to his feelings. He breakfasted with the literary circles, dined with the political, and supped with the fashionable. He also directed a great part of his attention at this time to the commerce and manufactures of France. During this visit to the French capital, he acquired the personal friendship of the immortal Buffon, of Necker, of his daughter, afterwards the celebrated Madame de Stael-Holstein, of Madame de Genlis, and of others whose names are familiar to the voice of fame. By a happy chance, his fellow-travellers from London were Joseph Montgolfier, the distinguished chemist, arithmetician, and aeronaut;* Argand, so well known for his improvements in the construction of lamps; and Reveillon, the great paper-manufacturer, whose premises Mr Sinclair found one of the most interesting objects in Paris. While there, he was enabled to make observations on several subjects of national moment. The improved machines for coinage, invented by Monsieur Droz of Switzerland, were at that time unknown in England; and having prevailed on that gentleman to explain his plans to Mr Bolton of Birmingham, he was thus the means of introducing this superior mode of coinage into the British mint. At the same time, he brought over the knowledge of a discovery still more valuable. Having gained the acquaintance of Monsieur Clouet, director of the national establishment for making gunpowder, he had some very important improvements in the manufacture of that article explained to him. These, on his return, he communicated to the English Government; and the Board of Ordnance were thus enabled not only to make a considerable saving in expense, but to provide an article very superior.†

---

* *Vide* Correspondence, vol. i. p. 64-69.

---

* Montgolfier informed Sir John that he and his brother were paper manufacturers in Languedoc, but had always felt a strong attachment to chemical and mathematical inquiries. They were thence led to procure all the information they could regarding those subjects. Montgolfier then stated, that he and his brother had talked over the possibility of ascending themselves, or of sending up large bodies from the earth, at a very early period, without however, having ever made any experiment to prove whether the idea was practical or not; but that having accidentally read an account of some experiments made by Dr Black, which explained the nature of the various kinds of airs or gases, and, in particular, their difference in point of weight, he immediately said to his brother, "The possibility of effecting what we talked of some time ago, seems to be proved by this great chemist: Let us try some experiments to ascertain its practicability." The progress of the discovery afterwards is well known. It is doubtful whether the attempt would ever have been made, had not the brothers been paper manufacturers as well as chemists; but the point which should be publicly made known is this, that had it not been for Dr Black's discoveries, no experiment would probably have been tried by the two Montgolfiers. This Sir John had on the evidence of the elder Montgolfier, who always mentioned Dr Black with that respect to which he was so peculiarly well entitled.

† It is rather a remarkable circumstance, that Dr Watson, the celebrated Bishop of Llandaff, claims the merit of proposing to Government that the wood employed in making gunpowder should be distilled in cylinders, which, he avers, produced a saving to the country of a hundred thousand pounds per

In 1786, Mr Sinclair resolved on making an extensive tour through the northern countries of Europe, with a view of contemplating their political and commercial phases. In the course of this journey, he travelled above 7500 miles, and made many valuable observations on the political, commercial, agricultural, moral and religious state of the Netherlands, Holland, Denmark, Sweden, Russia, Poland, Austria, and Prussia. He had personal interviews with the Emperor Joseph, the Empress Catharine, the Grand Duke of Russia, afterwards the unfortunate Emperor Paul, Stanislaus of Poland, Frederick William the Second of Prussia, Gustavus the Third of Sweden, Frederick the Sixth of Denmark, the Prince of Orange and Holland, and the celebrated Prince Ferdinand of Brunswick, the hero of Minden. It was not till the year 1830, when Sir John published two large volumes of his correspondence, that a digest of the remarks made during these travels was submitted to the public. They are in many respects both valuable and interesting, not only as relating to the period when they were made, but as affording grounds for contrast with the moral and political aspect of those dominions at the present day. Many graphic illustrations of personal character are preserved; and we have glimpses, as it were, into the private life of many whose names are blazoned on the rolls of historic renown. On his return, he established a correspondence with Count Hertzberg of Pomerania, minister to the King of Prussia, and author of several valuable works on agricultural subjects; Count Bernstoff, prime minister to the King of Denmark, whose son, the young Count, was induced to make a visit to Britain in 1800, principally with a view of acquiring

---

annum. That this discovery appertains to France, and was brought over to England in the manner mentioned, there can be no doubt. Indeed we have seen the memoranda of Sir John, in which he takes notice of his having confidentially mentioned the circumstance to the Bishop; and of his having arranged a meeting between the Duke of Richmond, then Master-General of the Ordnance, and the Doctor, who was personally unacquainted with his Grace.

Dr Watson has sadly misconstrued the circumstances of this visit, if, as implied in his Anecdotes of his own life (vide, p. 149), he supposed it an application made by Government to him for his advice, as to improving the strength of gunpowder.

That the merit of introducing the Continental improvement into Great Britain appertains to Sir John Sinclair, is as certain, as that Sir John did not write the Bishop's justly celebrated "Apology for the Bible."

agricultural knowledge, that he might be the more able to encourage, judiciously, the arts of husbandry in his own country; Count Marcoff, the ambassador from Petersburg at the Swedish court; as well as with many other distinguished political and literary characters on the Continent. Sir John was thus the fortunate means of opening up a good understanding between men, who had formerly stood aloof from each other from want of some common bond of union: and, from the communication of knowledge and sentiment which subsequent epistolary correspondence disclosed, many facilities were given to the furtherance of the arts of peace, and the general welfare of the human race. The foundation of many agricultural societies throughout Europe may be traced to the ramifications of the spirit which here began to unfold itself; and, without its fostering influence, many institutions at this moment flourishing, and doing practical service to humanity, would never have been dreamt of, or, if tried, would have perished for lack of countenance and support. The observations which Sir John was also able to make on commercial subjects at this time are also particularly worthy of attention, from his having grounds for drawing general deductions, by a comparison of the effects, in different kingdoms, of monopolies, prohibitions, and exorbitant duties; as also on the varieties of the moral constitution of man, attributable to national governments, and efficient or defective systems of education.

While in Germany Sir John more particularly directed his attention to the flourishing manufactures of that country, and carried away with him a variety of hints, which were afterwards put to practical purpose at home, by being communicated by him to those most likely to profit by them. Among others, Mr Wedgwood, to whom the earthenware manufacture of this country owes so much, was so gratified with the information regarding the making of china, which was thus obtained for him, that he presented in return to Sir John a dessert set of his finest ware.

On his return to his native country in 1787, Sir John commenced those improvements on his own estates, which have tended in a great measure to give a new physiognomy to the shire of Caithness. In a paper, drawn up by himself at a subsequent period, he well remarks, "That it is a peculiar disadvantage attending the cultivation and improvement of a remote and neglected district of a country, that every thing is to be done, and that a great variety of new and important objects must be attended to at one and the same time. Those who live in a part of the island, that has already made considerable progress, can hardly form an idea of the difficulties which must be surmounted, when towns and villages must be erected, as centres of communication and business; when roads and harbours must be made, for the sake of domestic and of foreign intercourse; when manufactures must be established, to provide employment for the surplus population, which an improved system of agriculture, and the enlargement of farms, necessarily occasion; and when new breeds of animals, new instruments of husbandry, and persons skilled in new modes of cultivation, must be introduced from distant parts of the kingdom. If it is possible, however, by the application of a great capital, and of great attention, successfully to carry on these objects together, the one has a tendency to promote and to encourage the other; the spirit that is excited for the improvement of one article rouses a similar spirit of energy in regard to another; and a new race of people is in a manner formed, who, from a state of torpor, ignorance, idleness, and its concomitant poverty, are animated to inquiry, roused to exertion, and impelled to obtain by their industry the acquisition of wealth." *

Nothing can be conceived more unpropitious in an improveable light, than the estate, as it originally passed into the hands of Sir John Sinclair. It was situated in five parishes, Thurso, Halkirk, Reay, Wick, and Latheron; comprehended 100,000 acres, or more than a quarter of the whole surface of the county of Caithness; and was estimated at nearly a fourth of the whole rental. Excepting a few large farms, or what are called *Mains*, it was at that time occupied by a number of small farmers, to the number of eight or nine hundred, holding their possessions in what are called *rig and rennel*, or intermixed with each other; and, beyond the outer fence of this motley farm, were nothing but wide uninclosed commons, free to all the neighbouring proprietors. A moiety of rent was paid in money; but by far the larger portion of it in grain, lamb, poultry, and other articles of produce.

---

* See Sketch of the Improvements carrying on by Sir John Sinclair, Bart. printed anno 1803.

Sir John found it, in the first place, necessary to establish some large farms, with a view of inducing persons of a competent property, to direct their attention to agricultural pursuits, as a suitable means of employing capital. As an incentive to others, he took into his own hands the farm of Stonefield, originally possessed by eight of the small tenantry; yet, deeming that a mixture of small farms is advantageous in a thinly peopled country, he encouraged them to settle in towns or villages, or in what have been since termed cottage farms. Having brought it into a proper state of cultivation, he let it at a very moderate rent, so as to induce the tenant to build a suitable house, and complete the improvements which had been commenced. To insure this, certain stipulations were entered into, by which the tenant was obliged to go on liming and marling to a certain extent every season; as, without this agreement, it was quite evident that the improvements would neither have gone on in the same degree, nor with the same rapidity.

To give the new system a fair trial, regular plans were drawn up of the different farms, by which it was ascertained how they could best be distinctly divided, and in what situations the houses and offices should be built. Services of every kind were abolished, as also *thirlage*, or restriction to particular mills. The miller was made a separate profession, whose care it was to bring the corn to the mill, and to carry it to market. The tenants were tied down to a regular rotation of crops, until the advantages of an improved system of husbandry should be made apparent to them; and every assistance was given them in procuring proper seeds, especially clover, rye-grass, and turnip. The selling of peat was prohibited, as an obstacle in the way of the tenants for collecting manure for their farms; and the burning of coals for fuel was recommended, principally with the view of keeping their whole attention directed to their farm management. Every facility was at the same time given them of purchasing marl; and lime was delivered to them at Thurso, at the lowest price at which it could be imported. Small premiums were also distributed, as an encouragement to industry. Many judicious hints were also at the same time distributed among the farmers.

They were recommended in the taking of land to have sufficient capital at starting, and never to depend on credit; to study their profession carefully before commencing it on their own account, and rather to cultivate fifty acres well, than a hundred in a slovenly manner; to endeavour to raise the best grain, to keep the best stock, and to cultivate the ground at the least possible expense.*

By following out this system of improvement, in a short time 2181 Scotch, or 2617 English acres, were brought under its operation;—1046 as pasture, and 1135 as arable land; the farmers themselves confessing, that they had themselves been amply remunerated, wherever they had rigorously followed out the chart prescribed for them.

A plan was also laid down for letting the hill farms on Skinnet and Leurary. It was suggested that they should consist, as nearly as possible, of twenty-five acres each, with an acre for house, garden, and offices, while the remaining twenty-four should be subdivided into fields, each of four acres, calculated for a rotation of six years. The leases were to be for twenty-one years, and from one to five shillings an acre as rent for the first seven years, with a gradual increase during the remainder of the lease. On entering upon his lease, each tenant, on finding security for his laying out the same properly, was to get a sum of money to assist in building operations, and, at its expiry, a certain additional sum was to be allowed him, according to the value of the premises erected. The position of the house and garden was to be under the direction of the proprietor.

It was stipulated that twelve acres should be put into a state of cultivation within the three first years, and four acres every year after, until the whole were brought under the plough. The subdivision of this part of the arrangement was, that, after the first seven years, the tenant should have eight acres in corn, eight in pasture, four in green crops, and four in sown grass, either cut green, or made into hay, and the rotation was to be thus—1. Fallow or green crops; 2. grain, with grass seeds; 3. grass, either made into hay or cut green; 4. pasture; 5. ditto;

---

* Vide Appendix to Henderson's General View of the County of Caithness, p. 42-46.

and, 6. oats; and so on till the expiry of the lease. The tenants were also to be allowed at entry a sum of money for inclosing, on finding security for executing the same, according to a plan laid down; and sheep, being so destructive to hedging, planting, and similar improvements, it was stipulated, that none should be kept without the express leave of the proprietor.

In a short time no less than fifty farms on this plan were laid down, in addition to the tract bordering on the old arable fields. Great exertions were made to bring this extensive tract into cultivation, and, even within the first year, considerable progress was made. The greatest difficulty the settlers experienced consisted in the provision of hay and straw for their cattle and horses, until they could raise those necessaries themselves. In cultivating extensive wastes, it is for this reason necessary that there should be some arable land in the vicinity; and, from this circumstance not being sufficiently attended to, many attempts at improvement have been entirely frustrated, which might otherwise have proved successful.

The improvements in the parish of Wick and the lower part of the parish of Latheron were, at the same time, carried on with great energy and success by Captain Brodie of Hopeville. Houses were built, mosses drained, villages planned, wastes inclosed, harbours cleared, and roads made. On the grounds of Wester Clyth and Roster, great attention was also paid to the fisheries by Dr Henderson. Where only one boat had been employed in the herring-fishery, he, in a short time, increased the number to thirty, exclusive of a number of small ones; and the produce of one year was three thousand barrels of herrings.

The improvements on the estate of Langwell were on a still more extensive plan, and were carried into effect with even still greater success. Besides the inclosure of arable and the improvement of waste lands, it was resolved to raise the value of that extensive property principally by converting it from cattle into sheep farms. The great difficulty at the outset arose from the estate being occupied by not less than eighty small tenants, whose united rental did not exceed two hundred and fifty pounds per annum. Nothing was bred but a few cattle, and nothing fed but some wandering red-deer, on the upper part of the property. Humanity, however, required that five hundred offenceless individuals should be provided for; and this was done by adopting the plan of cottage farms, each consisting of two acres of arable land. In reference to this property, Sir John Sinclair has well remarked, that "of all the means of bringing a mountainous district to a profitable state, none is so peculiarly well calculated for that purpose as the rearing of a valuable breed of sheep. A small proportion alone of such a description of country can be fit for grain, and, in regard to cattle, for every pound of beef that can be produced in a hilly district, three pounds of mutton can be obtained, and there is the wool into the bargain. Besides, wool is an article easily transported, of essential use, for which there is in general a regular demand, and which is capable of great improvement. Sheep, also, generally sell with less variation of price than cattle, and are easily driven to market."*

In a pecuniary point of view, the advantages which resulted from these improvements on the estate of Langwell were very great, and within a few years raised the rental from under three hundred to above sixteen hundred pounds per annum; and, in a moral point of view, were of incalculable benefit to the natives of the district. A spirit of industry and emulation was introduced, and the women had spinning-wheels distributed among them by wheel-wrights, who were set up there for that purpose. Nothing, at first sight, could be more forbidding, more complicated, and operose, than this system; and yet, by perseverance, it was made to answer beyond the most sanguine expectations. A rude was converted into a civilised district, and the country was improved without being depopulated.

In connection with the estate of Langwell, it should be mentioned, that at the time when Sir John purchased it, he had commenced his plans for the improvement of British wool; and it occurred to him as a most proper place, to ascertain whether a certain breed of mountain sheep, to which had been given the name of *Cheviot*, would thrive in those more northern districts. Alike in Northumberland and in Caithness the idea was scouted as visionary. Among the northern mountains sheep had never been kept during winter, except in houses; and it was thought impossible to make them brave the boreal storms. Sir John, however, was determined not to abandon the attempt without trial; and knowing that, if he made it on a small scale, and trusted the sheep to the care of native shepherds, they would be allowed to perish, he sent north a flock of five hundred at once, accompanied by the most experienced shepherds. The succeeding winter happened to be a stormy one, with great falls of snow; yet the flocks prospered, and few suffered either from disease or want. The principal loss arose from the attacks of foxes in spring on the young lambs; and it required great vigilance to keep that nuisance under. In a short time it was found, that instead of perishing, the Cheviot sheep throve fully better in Caithness than even on their native hills, and their numbers had increased to six thousand.

---

* Vide Appendix to Henderson's General View of the Agriculture of Caithness, p. 58.

When Sir John purchased the estate of Langwell, the rental was only L. 282, and he bought it for L. 8000; but so much had he increased its value by improvements of every kind, that when he was subsequently induced to sell it, it brought him the sum of L. 40,000,—an increase quite unprecedented in the annals of buying and selling.

Having thus described, in a general way, the plan of agricultural improvement introduced by Sir John Sinclair into Caithness, both as adapted to the valley and mountain districts, we cannot do more than merely allude to the concomitant improvements accomplished, in the way of forming roads, raising plantations, working mines, establishing inns for the accommodation of travellers, constructing harbours, and opening up new channels for the extension of commerce and manufactures.

Great difficulties were at first experienced in improving the roads in the county of Caithness, the soil being either of clay or peat, and the materials for making or mending them of a softish quality. Sir John, however, got Government interested in the undertaking, and perhaps the greatest exertion ever made in road-making in Scotland was when he had 1270 men employed at one time, along the side of the hill of Bennichiel, and laid down six miles in one day. Nor was the situation of Caithness more favourably adapted for the growth of plantations, being a promontory, two-thirds of which are surrounded by the sea, whose spray is so injurious to the growth of trees. Add to this, that the soil of a great part of it lies on a flat rock, preventing the roots from penetrating to a proper depth. Attempts were however made, with considerable success in many places that seemed of little promise; and, in the parts adjoining Sutherland, on the eastern coast, not less than 320,000 Scotch firs, besides 22,000 larches, ashs, mountain ashs, elms, and sycamores, were thriving in situations which at one time appeared destined to perpetual sterility and bleakness.

In the fisheries a new source of wealth and industry was opened up to the inhabitants; and they, to this moment, continue, as all know, in a most thriving state. Indeed, no district in the British dominions is better calculated for that branch of commerce, there being above forty different varieties of fish, either in the fresh waters of the county or in the adjacent seas. The greater part of the cod with which the London market is supplied, is taken almost within sight of the town of Thurso, and the fishing-smacks employed for the purpose rendezvous at Scrabster Road, in its immediate neighbourhood. The most important branch of the fishery, however, is that of herrings, which are cured for home or foreign consumption. Sir John Sinclair early foresaw the extent to which these fisheries might and would be carried; as also their vital importance to the prosperity of Caithness. So early as 1787, he induced the Messrs Fall of Dunbar to re-establish the cod-fishery, which had been nearly abandoned for many years; and he furnished capital to John Sutherland of Wester, and to John Anderson of Wick, to enable them to commence a herring-fishery on the east coast, which ultimately proved so successful as to have yielded, in one year, above 200,000 barrels.

Sir John also procured public aid for increasing harbour accommodation; and, at the expense of L.12,000, that of Wick was completed. An act was also obtained for constructing the harbour of Thurso, which if completed would prove so beneficial to the neighbourhood. From the sale of the surplus produce of the farmer, an incitement was given to commerce; and while he was accumulating capital wherewith to improve his stock, the quality of his grain, and his implements of husbandry, as well as increase his domestic comforts, his intercourse with the trader tended to mutual prosperity and enlightenment. The commerce, which had hitherto been insignificant, and consisted chiefly of grain, cattle, and fish, rapidly increased; and a trade has been opened up, not only with the Baltic, but with the West India Islands. Tanneries have been erected, bleachfields laid down, and woollen manufactories established.

Impressed with the idea, that wherever a number of inhabitants are collected together, they furnish a market for agricultural produce, which of course increases with the demand, Sir John used every exertion to enlarge the town of Thurso, at that time containing sixteen hundred inhabitants. It was, however, very irregularly built, and in some parts so crowded as to be prejudicial to the health of the people. He therefore resolved on laying down the plan of a New Town, to be built regularly, and in which he consulted both beauty and convenience. How well this has succeeded the reader need scarcely be reminded. Its situation for commerce is admirable, being within a few hours sail of the German and Atlantic Oceans; and nothing can surpass its convenience for fisheries, that great source of northern wealth. It is pleasing to think, that almost by the unaided enterprise of one mind, what was in the memory of man the bare bank of a Highland river, is now a flourishing town, with its churches and market-places, its boarding-schools and academies, its shops and warehouses; that the silence and the solitude is now filled with the hum of human life, and that elegance and comfort have taken the place of those necessities, which chained down man to an estate so much beneath his physical capabilities as well as his immortal destiny.

Such is a meagre and general outline of the improvements which Sir John Sinclair planned, attempted, and successfully carried into execution in the shire of Caithness. Let it be remembered, that when he succeeded to his estate, the whole county might be said to be in a state of nature. The tenantry had not a single cart in their possession; and, even if they had, there was not a single road anywhere. Every article, not excepting manure, was carried on horseback, and the ground was almost everywhere cultivated on the common field, or alternate ridge system. So numerous were the disadvantages under which his improvements—by many they were considered mere innovations—were commenced, that they would have daunted and cooled a spirit of ordinary energy and enterprise. He had not only to arrange plans, but he had to provide the adequate capital for carrying these into execution. He had not only to procure from other districts the hands requisite for various branches of the intended system of improvement, but he had to overcome the prejudices, many and deep-rooted, of the natives themselves, and stimulate them to worthy exertion. All this was carried on in the midst of a foreign war, which diminished the number of labourers, checked circulation in the remote provinces, and augmented public burdens, already but too severely felt. How successfully, however, may be attested by comparing the population census of the kingdom in 1810 with that of 1820. It will there be seen, that the proportionate increase is greater in Caithness than in any county in the British empire; and not only was the population numerically greater, but one of a very different kind, from what had inhabited these shores in previous generations. Enterprise, industry, morality, and religion, went hand in hand together. The coasts were occupied by extensive fisheries; and the soil, allowing for difference of climate, exhibited as excellent, and as skilful management, as the most celebrated districts of the Lothians.*

Pope, however, has well remarked, that "Envy will follow merit like its shade." Many minds were incapable of taking in the extent of operations, which to their feeble comprehensions seemed theoretic and Utopian. There was too much uprooting of old prejudices not to excite detraction and invidious surmises; and these feelings were necessarily aggravated by the circumstance of its being requisite to remove many from their humble, and rude, and unambitious, yet ancestral dwellings, to give scope for what sceptics set down as mere experimental speculations. Attacks, on this score, were made upon Sir John, even in some of the English newspapers. But to more than counterbalance the ignorance and ingratitude regarding the character of a great man, which these manifested, he was presented, in 1811 (when his plans had received "ample room and verge enough" for practical application), with an address from the Magistrates of Thurso, "acknowledging with gratitude, that, amidst other pursuits of a more extensive tendency, the improvement of his native county had been the peculiar object of his care and attention." Previous to this, the Lord Lieutenant and Freeholders of Caithness had tendered him a vote of thanks for having carried through so many measures, which had proved "a solid foundation for the future prosperity of the county." Before leaving this part of our subject, it is pleasing to add the testimony of one of the great living ornaments of the Scottish bar, to the merits of the subject of this biography. Mr Forsyth, in his dedication to Sir John Sinclair of the fifth volume of the Beauties of Scotland,—that containing the Account of Caithness,—eulogises him in the following terms:—"Sir, this volume is respectfully addressed to the distinguished promoter and patron of the important art to which nations owe their subsistence; of whom, in future times, it will be said, that he found means to diffuse among mankind a larger portion of useful knowledge than had been accomplished by any individual of his own, or of any former age." We make no commentary on these sentiments so true in themselves, and so simply, yet beautifully, expressed. On the one hand, it must have been delightful to know, that the merited subject of such a panegyric was of his own nation and generation; and, on the other, it must have been no small gratification to be thus made aware, that the philanthropic labours, intended for the good of all mankind, were at least appreciated by the wise and good among them.

---

* A native of Caithness (Mr George Anderson), was induced by feelings of gratitude, to bequeath to Sir John Sinclair, claims to a very large amount against the Nabob of Arcot. The bequest was made in the following terms:

"Having received the fullest assurances from the Right Honourable Henry Dundas, in person, and from the Minister, conveyed to me through the channel of George Rose, Esq. that my claims upon his Highness the Nabob of Arcot should be their business to see adjusted; as his Highness has candidly acknowledged the various sums lent him were for the use of the Honourable Company—I do hereby assign and make over the whole of those claims above stated, to my much respected friend, Sir John Sinclair, as the grateful tribute of his countryman, in order to enable him to carry into execution those patriotic measures, which his public spirit and his philanthropy have suggested, but which his fortune may not be adequate to."

As there was every reason to hope that a legacy, left in such terms as these would be made effectual, it was natural to rely on its being rendered available; but when the question came under the consideration of the Carnatic Commissioners, they found thomselves, unfortunately, under the necessity of disallowing the claims, from the difficulty of procuring the necessary evidence from such a distance as Madras.

In 1788, Sir John Sinclair was created a Doctor of Laws by the University of Glasgow, and, in the same year, was married, for the second time, to Diana, daughter of Alexander Lord Macdonald, by whom he had thirteen children, seven of whom were sons, and six daughters. His oldest son, the present Sir George Sinclair, is member for the shire of Caithness.*

Having mentioned the success of Sir John's speculations, in carrying the system of sheep-farming into the northern districts of Scotland, we turn now to his exertions in an important branch of the same subject,—the improvement of wool.

Prior to this period, the introduction of turnips and other coarse articles of food had greatly deteriorated the quality of British wool, and ruinously depressed this hitherto most lucrative and important department of home-manufacture. The consequence was, that importation was, year after year, rendered more and more necessary; and the production of British fleeces ceased to be a principal source of national opulence. It struck Sir John as rather singular, that the Shetland Islands, on the other hand, should produce a wool of a very superior quality, and suitable for the softest and finest fabrics. With his usual avidity for information, he put out feelers everywhere; and at length, during the sittings of the General Assembly of the Scottish Church in 1791, of which he was a lay-member, he found, in the person of a clergyman from that remote quarter, an individual capable of enlightening him on this subject. His first impulse was to bring the subject before the Highland Society; but, discovering that their funds were inadequate for the prosecution of his object to any available extent, he resolved on instituting a Society, solely for the purpose of improving British wool. The institution once established, its business was prosecuted with an energy almost unexampled. To ascertain the merits of the respective breeds in the British dominions, intelligent individuals were sent to the principal districts, and accounts of their investigations on the subject were submitted to the public. Specimens of a valuable breed, from the neighbourhood of the Cheviot Hills, were distributed throughout Scotland; the custodier of the royal flock of France, M. D'Aubenton, sent several rams and ewes to the Society; and from Italy, from Iceland, and even from Abyssinia, and the East Indies, specimens were procured by the exertions of spirited and enterprising members

---

* When Sir George was a youth of sixteen, travelling on the Continent, an incident befel him, which, as it is highly honourable to the European reputation of his father, we cannot pass over without notice. The following extract is from a German newspaper, the *Erlanger Zeitung*, of the 18th October 1806, and was copied into many of the south German newspapers:—

"A few days ago a young Englishman who had been for some months at Gotha college, and was on his way to Dresden, along with his tutor, a native of Germany, was brought early in the morning by a horse-patrole before the Emperor Napoleon. The persons who arrested them took them for spies; something, however, struck them about the young man, and they brought him into the Emperor's presence, who in person condescended to examine them. His Majesty was gratified and much pleased to have an opportunity of shewing his regard for literature, and eminent characters of whatever nation; for the young Briton turned out to be the son of the well-known financial and statistical writer, Sir John Sinclair of Scotland, who had given his son the advantages of a continental education. It is unnecessary to add, that the interesting youth was furnished with a passport, by desire of the Emperor, and very civilly dealt with. It was remarked, that he had a plan of education, written by his father, upon him when arrested, and that plan saved him from the harshness of a rigid examination, and even personal danger."

Such was the success of the Institution; and still more to get the public mind interested in these beneficial inquiries, it was resolved to hold a great sheep-shearing festival. At first sight this might appear rather *outré* and overstrained; but the proof of its applicability to the purpose intended was judged of by its success. It was held at New-Hall Inn, on the 1st of July 1791. About one hundred and ten individuals of rank and distinction were present, of whom seventy were gentlemen, and fifty ladies; and the company were received as they arrived by Sir John, the chairman of the Society. A grass plot in the garden of Mr Dundas of Duddingston was appropriated to the purpose of the exhibition; specimens of various kinds of wool were shewn, and dressed skins of a variety of different breeds, with the fleeces adhering; while the grounds were set off with suitable decorations. Sheep of various countries were collected in the garden, and on the neighbouring banks,—Spanish, English, Scottish, Shetland, and a few Abyssinian, sent by Mr Dundas of Dundas.

After the sheep-shearing, during which the superiority of Mr Cully's clipper was greatly admired, the wool of the various breeds was labelled and exhibited, with remarks on the peculiarity of texture, by which each was characterized.

The evening of the auspicious day was spent in conviviality and dancing; and, when the chairman gave as his first toast after dinner, "The Royal Shepherd of Great Britain, and success to his Flock," a round of twenty-one guns was fired by the Hind Frigate, which lay at anchor on the adjacent coast. Besides a large proportion of the nobility and gentry of Scotland, who made up the company, Sir Thomas Blackett, Mr Askew, and others, came even from England to be present on the occasion.*

In the May of the previous year the idea of that great national undertaking, the Statistical Account of Scotland, had suggested itself to the mind of Sir John Sinclair; and being, as we have mentioned, a lay member of the Assembly of the Church, it occurred to him that he might be able to prevail on a great proportion of the clergy to furnish such general information regarding the state of Scotland, as should afford data for an estimation of the political situation of that portion of the United Kingdom. His original plan was to draw up a general statistical view of North Britain, without reference to parochial districts; but such a mass of useful facts and observations was presented in the communications sent him by the clergy, that this more abridged idea was set aside, and the work prepared for press in the more extended form in which it was given to the world.*

---

* "The ladies were in general dressed in white muslin with flowers, and various coloured-ribbons; and each bore a shepherdess's crook, decorated with taste and fancy. The day being favourable, the appearance on the green, of so much beauty and elegance, afforded a spectacle at once pleasing and interesting. And here none was more distinguished than the venerable patriotic Countess Dowager of Dundonald, whose hat was decorated with a bandeau of wool from her own flock, and dyed by herself of various beautiful vivid colours, which had a fine effect. Several of the gentlemen were presented by her ladyship with cockades, and other ornaments of this material. The gentlemen were dressed variously, as taste and fancy suggested. Some of them appeared in cloth made from their own flocks, with crooks on their buttons, &c. and some of the ladies in gowns of their own spinning.

"As this was the origin of the sheep-shearing festivals, which have since promoted such a spirit of improvement in the country, it was thought proper to preserve an account of it in this Appendix."—*Henderson's Caithness, Appendix, No VI. pp. 105–6.*

The mode which Sir John adopted for obtaining information on the different divisions of his subject, was by printing and circulating queries respecting the geography and natural history of each parish, its population, and productions. Miscellaneous questions followed, and the addenda to the whole were these— 1. What is the state of the roads and bridges in the parish? how were they originally made? how are they kept in repair? is the statute-labour exacted in kind, or commuted? are there any turnpikes? and what is the general opinion of the advantages of turnpike roads? 2. What is in general the rent of the best arable, and the best pasture or meadow grounds per acre? what the rent of inferior? 3. What in general is the size and the average rent of the farms in the parish? and is the number of farms increasing or diminishing? 4. Is the ground in general inclosed or uninclosed? and are the people convinced of the advantages of inclosures? 5. What was the situation of the parish anno 1782 and 1783? please state any curious or important circumstances connected with that era, or with any other season of scarcity? 6. Are there any curious or important facts tending to prove any great alteration in the manners, customs, dress, style of living, &c. of the inhabitants of the parish now, and twenty or fifty years ago? Additional queries were given to those resident in cities and towns relative to the history and antiquities of the place, its municipal government, right of parliamentary representation, and number of electors, and comparison between its ancient and modern state with reference to population, shipping, commerce, fisheries, and manufactures.*

---

* "About this time a plan had been formed to establish a Society for the Benefit of the Sons of the Clergy belonging to the Established Church of Scotland, and it accidentally occurred to me, that some public assistance might be procured for so useful an institution, as an acknowledgment to the clergy for their statistical exertions.

"Sir Henry Moncreiff and Dr Hardie, who took an active part in the concerns of the Society, expressed great doubts respecting the practicability of obtaining such a grant; but the Society having at last been prevailed upon to resolve on sending a petition to the Crown, the application was transmitted to Mr Secretary Dundas, who, in a communication to me upon the subject, said, 'That he felt peculiar pleasure in submitting to his Majesty's consideration the petition for a grant to the Society for the Benefit of the Sons of the Clergy, more especially as they had so handsomely stepped forward to aid so important a public object as the Statistical Account; and he hoped that such a mark of royal favour as his Majesty had determined to bestow would have the effect of rendering them more and more zealous in their statistical researches.' The sum granted was L.2000.

"The exertions made by Sir Henry Moncreiff and his friend Dr Hardie in establishing this Society did them the greatest credit."—*Correspondence of Sir John Sinclair*, vol. i. p. 294.

Having received a number of returns in consequence of the circulation of these queries, and some of them drawn up in a regular form, Sir John resolved on the printing of a volume of parochial reports; and he put this determination into execution in January 1791, on his return from London to Edinburgh, whither he had been in the discharge of his parliamentary duties. This specimen volume contained only the accounts of four parishes—Jedburgh, Holywood, Portpatrick, and Hounam,—and a thousand copies were thrown off for distribution among the clergy. Each copy was accompanied by a printed letter, containing some queries additional to those already sent, regarding schools, alehouses, and inns, new houses, employment of cottagers in agriculture, number of prisoners in gaol, and causes of imprisonment, as also tables of births, marriages, and deaths.

After great and unwearied exertions, Sir John succeeded in bringing the first volume of this great work before the public on the 25th May 1791, just a year after its suggestion to the members of the church. It proved so far superior to any thing of the kind which had ever before appeared, that it could not be supposed to have otherwise than given great satisfaction, and all who were interested in the improvement of the country or the welfare of its inhabitants came at once forward for its patronage and support. Much difficulty was, however, found in the furtherance of the undertaking, from Sir John being necessarily so much absent from Scotland, and consequently obliged to rely on others not only for preparing the communications, but for correcting the press. The leisure afforded by a parliamentary recess greatly aided the bringing out of the second volume, which was one of peculiar interest, from the mass of curious and valuable matter it contained.

---

* Vide Appendix B. to volume twentieth of Statistical Account of Scotland, p. 18–36.

Still it was very difficult to get many individuals of the clergy roused to exertion; and it required some inducement to prevail on the backward to prosecute the necessary inquiries. It had been arranged from the commencement that the profits of the publication should be gifted to the society instituted for the benefit of the Sons of the Clergy; and it occurred to Sir John, that a royal grant might possibly be procured for the same benevolent purpose. He accordingly made application to his Majesty through Lord Melville, then Mr Secretary Dundas, and two thousand pounds were the fruits of this well-timed intercession. By the accession of this sum to their funds, the Society were enabled to commence their allowances to the sons of the clergy much sooner than it would otherwise have been in their power to have done.

Many circumstances yet occurred to prevent unanimity among such a large body as the clergy of the Church of Scotland. From the commencement some had thought the scheme chimerical, and others had openly professed their dislike to it, nor did they now care about retracting opinions rashly given. Old age and infirmity prevented others; and not a few were unable to overcome the jealous fears of their parishioners, who set down the whole as a deep laid scheme of government to accomplish some new plan of taxation. Nor did the tenants in country parishes relish inquiries about their farm produce, and the value of their stock, lest landlords might avail themselves of the information, by increasing their rents. Such an array of counteracting difficulties would have daunted and destroyed the energy of any common mind. After waiting another twelvemonth, during which he had written many thousand letters, Sir John found, on the 1st June 1792, that there was still a deficiency of not less than four hundred and thirteen parochial accounts.

In this dilemma various plans were suggested for accomplishing the completion of this great national work. A recommendation from the General Assembly was one of the measures resorted to, and several of the leading ornaments of the church, among whom may be mentioned Principal Robertson, Dr Blair, Sir Henry Moncreiff Wellwood, Dr Kemp, and Dr Hardie, made personal application to their clerical friends, to exert them selves within the bounds of their several presbyteries. Added to these, the Duke of Argyle, the Earl of Leven, then Commissioner to the Assembly, the Earl of Fife, and other extensive landed proprietors and church patrons, exerted themselves in the cause; yet Sir John was still destined to find, that some, from unwillingness to engage in the undertaking, would do nothing; and that others, from a spirit of procrastination, promised with little intention of performing.

Notwithstanding all these multiplied and mortifying difficulties, Sir John was determined not to be baffled in the accomplishment of the Herculean task which he had set himself. He engaged five statistical missionaries, to whom he appropriated different divisions of the country. To one were allotted the Western Islands; to a second the counties of Aberdeen and Banff; to a third the presbyteries of Dunkeld and Perth; to a fourth the shires of Dumfries and Galloway; and to a fifth the Orkney Islands; and, by their means, the accounts of no less than twenty-five parishes, which must otherwise have been totally awanting, were ably and accurately drawn up.

The undertaking seemed now in a fair way to its final accomplishment, and the reports, as they were received from the clergy, were transmitted to Sir John, who was at the time in London, to receive his sanction, and be incorporated in the work. Lists of the whole were now made up; but what must have been his discouragement to find, that no less than twelve parochial accounts, supposed to have been received, were nowhere to be found. The uneasiness occasioned by this untoward circumstance it is impossible to describe, and is said to have been more disheartening to the enthusiastic mind of the editor, than any thing which had occurred in the whole course of the undertaking. But he once more buckled on the armour of perseverance; and, on the 1st of January 1798, seven years and a half after its commencement, the work was brought to its completion. The attempt was quite unique in the history of literature, as not less than nine hundred persons were engaged in it, under the direction of one person, and that a private individual, who was necessarily at once the animating spirit and the bond of union connecting the whole. The work was comprised in twenty thick octavo volumes; and to these another was subsequently annexed, containing some additional materials; accounts of the University of Glasgow, and the Old and New Colleges of Aberdeen; together with a copious index to the contents of the whole series.

It was thus that a Work was carried on to a successful termination, whose commencement, whether we consider its extent or the difficulties besetting its accomplishment, would have completely daunted ordinary enterprise. For some time after Sir John had formed the scheme, and was planning in his own mind how it could best be carried into execution, he could not find the countenance of a single individual. All thought ill of its practicability—no one could oversee the obstacles encompassing it on every side. Even after he had put his shoulder to the wheel, and had fairly commenced his task, prognostications of failure were heard from all quarters. Mr Newté, in his Travels, published about this time, thus alludes to the undertaking:—"There have not been wanting different persons, public-spirited indeed, but perhaps of too sanguine dispositions, who, struck with the subserviency of parochial distinction, to the advancement of both civil and natural history, have addressed letters to the different parishes of Scotland, and particularly to the clergy, inviting them to a correspondence, on whatever might appear most curious and interesting in their respective divisions. These gentlemen do not reflect that there is no individual, however distinguished by genius, rank, or fortune, or even by a happy or rare union of all these advantages, who can possibly be considered by a whole nation as a fit centre for such general co-operation." *

The unwearied perseverance, and the inflexible industry of Sir John Sinclair, however, shewed, as the work went on, that almost nothing is impossible to efforts unceasingly directed to a proper object, however apparently unattainable that object may at first sight appear. By degrees an irradiation of hope glimmered on the incredulity of the multitude; and what had been denounced as wholly and utterly impracticable, and which probably in any other hands than those of Sir John Sinclair would have proved so, appeared only in the light of a gigantic and Herculean labour. Some who had been shamed out of their scepticism came forward with the language of congratulation,

---

* Newte's Travels, 4to, p. 427. London, 1791.

and others, interested in the prosecution of the work, approached at the eleventh hour to participate in the triumphs of its success. It ought to be mentioned, that one of the earliest of those that cheered on Sir John in this great undertaking, was the celebrated George Dempster of Dunnichen.[*] In a letter dated 14th February 1791, he thus writes: "The reason of my troubling you at present, is to return you my thanks for the specimen of the statistical observations. This is a most valuable and useful book. It is a real Doomsday book, and promises to be more read and quoted than any book printed since Doomsday book. The older it grows the more valuable it will prove. The object of this letter is to entreat you to go on with it." On the 22d May, we find the Marquis del Campo, the Spanish Ambassador, thus addressing him: "I have read with great pleasure indeed, the prospectus you have been so good as to send me, and I admire the manner in which the general inquiry regarding the political state, population, industry, &c. of a kingdom is treated." And the Prussian Minister, the Comte de Redern, is still more warm in his admiration: "The interesting details contained in that work," he says, in a letter dated 14th July of the same year, "cannot fail to make the public impatient for the conclusion of so great an undertaking. The plan embraces all those objects on which depends the prosperity of political society; and the researches founded thereon, seem to be equally extensive and laborious." Still more cheering and important was the following testimony from Comte de Hertsberg, formerly the Prime Minister of Frederick the Great of Prussia and a person of great intellect and accomplishments. His letter to Sir John was dated 19th August 1792: "I return you many thanks for your analysis of the Statistical Account of Scotland, and wish I could converse with you on a number of objects, which are equally interesting to both our countries. I entirely approve of your very excellent idea, that of investigating the interior state of every district, by reports from the ministers of each parish; and I am of your opinion, that, if provided with good models, no class of men could be more proper for such an important undertaking than the parochial clergy, who have usually the requisite knowledge and capacity, as well as the necessary leisure, for that purpose. I earnestly wish that I could imitate here, in my dear country, your very patriotic example." In a subsequent letter, dated Berlin, 1793, the Comte says, "I have to return my best thanks for your interesting work, the Statistical Account of the Parishes of Scotland. I find the plan particularly well formed; and if I were again at the head of the Prussian Cabinet, would carry it into execution here." We could add to these testimonies others equally gratifying from Professor Zimmerman of Brunswick; Monsieur Pleschcef, author of the Geographical View of the Russian Empire; from Professor Thorkelin of Copenhagen; from Mr Adams, the President of the United States of America; from Lord Auckland; from Mr Pinkerton, and from Dr Guthrie, the Geographers; from Dr Gillies the Historian, and many others. We cannot, however, pass over, without quotation, the countenance and encouragement given to Sir John in the prosecution of this great work, by the greatest of American statesmen and generals, George Washington. His letter is dated the 15th March 1793: "I cannot but express myself highly pleased," says he, "with the undertaking in which you were engaged (that of drawing up the Statistical Account of Scotland), and give my best wishes for its success. I am fully persuaded, that when enlightened men will take the trouble to examine so minutely into the state of society, as your inquiries seem to go, it must result in greatly ameliorating the condition of the people, promoting the interests of civil society, and the happiness of mankind at large. These are objects truly worthy the attention of a great mind, and every friend to the human race must readily lend his aid towards its accomplishment."

---

[*] "A garter gie to Willie Pitt,
A title Dempster merits it."—*Burns.*

Stimulated by the success which had attended the exertions of Sir John Sinclair, the same plan was attempted in various countries on the Continent, but in none with the perfect success with which it has been accomplished in Scotland. That, seconding the exertions of Sir John, great merit is due to the clergy, we most readily admit. In the Statistical Accounts of their separate parishes they have raised a monument to their talents, acquirements, and observation, highly honourable not only to the religious establishment to which they belong, but to the national character.* Yet, on the other hand, it must be allowed, that without such a man as Sir John Sinclair to direct inquiry, and to concentrate into harmony and order the loose and unshapely mass of information accumulated, to make up what was deficient, and to prune away what was redundant, the work could never have assumed the form in which it has come forth to enrich our literature. Without partiality it may be asserted, that it is the most comprehensive and complete, and consequently the most valuable publication on statistics extant in any language; and so little has its plan been found capable of improvement, that, with slight variation, it forms the model of the admirable refacciaments now in the course of publication.† Indeed, every one competent to judge of the difficulties encompassing such a subject must, taking it all in all, accede to the enconium pronounced upon it by Malthus, that it presents "a better picture of the internal state of a country, than has yet been presented to the world."‡

---

* In reference to this work, the Comte d'Hautrive, in his "Elemens d'Economie Politique," (Paris, 1817) p. 368, has the following remark:—"L'Ecosse est le pays oû l'esprit d'observation est aujourd'hui le plus perfectionné."

† See Introduction to number first of New Statistical Account. Nine parts have already appeared, and many of the reports are of first-rate excellence. The parochial division has been adopted, and the parishes are exhibited under their respective counties. The following divisions have been adopted:—1. Topography and Natural History; 2. Civil History; 3. Population; 4. Industry; 5. Parochial Economy. A county Map is given with each number. It is intended that the work shall be concluded by a general summary, descriptive of the whole statistical condition of Scotland; and it is expected that all the materials will be condensed into ten octavo volumes. It is conducted by a committee of the Society for the Benefit of the Sons and Daughters of the Clergy.

‡ Malthus on Population, edition first, 1803. Vide p. 13 and 14, note.

(*To be continued in next Number.*)

# ON THE CORN TRADE OF FRANCE AND HAMBURG.

By Mr Fearnside.

[What follows should have formed a continuation of Mr Fearnside's paper at page 543 of this number; but unfortunately did not reach us till it had been printed off.—Ed.]

## I. FRANCE.

Since the year 1832, France has experienced a series of productive harvests, which may be arranged under the following classification :—1832-33, the crops were most abundant; 1833-34, good; 1834-35, ordinary; 1835-36, good. In 1833, the harvest was reaped with extensive stocks of wheat on hand; in 1834, though these resources had not augmented, yet the diminution which had taken place was only trifling; in 1835, the amount remaining with the farmers and in warehouse was inconsiderable, the attacks of the worm and weevil, added to the unfavourable results of different speculative exports, had rendered the greatest portion of the granaries empty, or the quality had been so much deteriorated, as to make the samples of little value. Such was the state of the grain trade, when the harvest of 1835 was about arriving at maturity. The absence of frost during the winter had removed any apprehensions for the growing plants. If therefore the aspect of the forthcoming grain had been unpromising, and if instead of abundance, an inferior growth had been anticipated, or only the promise of an ordinary crop like that of 1834, prices no doubt would have rapidly advanced; but the produce of even poor soils looked well, and the prospect of plenty checked any chance of improvement in the currencies; millers therefore allowed themselves to run out of stock, procuring only supplies for their immediate wants; the drought also contributed in preventing demand, by rendering the smaller mills useless, and the larger being only enabled to work with diminished force. Millers therefore, in many instances, refrained from appearing at market, which may be assigned as one of the principal causes of prices continuing depressed.

Business remained in this languid state until harvest, and the causes which had operated in forcing down prices remained unaltered; the advices from all the departments representing the crop of wheat as abundant, and it occurred, as is generally the case under similar circumstances, particularly in the commercial world, that the amount of the produce was in the opinion of the trade considerably increased beyond the probable yield. Samples were offering on all sides, and the markets became overstocked; purchasers abstaining from buying in proportion as sellers pressed their flour on the market; sales were in consequence very difficult to be effected. Some speculators tempted bakers by offering flour on delivery at prices which had not been known for the last ten years, and which seemed almost to belong to another era. The price of wheat was forced down with that of flour, and the prepossession against any reaction was to such an extent, that contractors hesitated even at the lowest rates, when a good margin was afforded them of getting into stock to meet their deliveries, under the impression that towards Martinmas, they would be enabled to procure the corn from the farmers on still more favourable terms. In the mean time the granaries and stores were being exhausted; the market at Paris was daily decreasing in stock; the markets of the neighbouring parts of the country towards the middle of November evinced by their supplies little instance of superabundance; speculators therefore in old wheat were in some instances remunerated in having retained their stocks, and others, who had to deliver, lost much of the profit that might have been gained; other central points of consumption as Bourdeaux, and particularly Marseilles, experienced a considerable falling off in their supply, and the rise which has since manifested itself, has not been sudden and immediate as at the period of a crisis, but slow, progressive, and rational, prices not having receded as low as was at one time anticipated; though it should have been recollected, that reaction is certain of succeeding any violent depression, for when wheat falls to so low a price, speculative attention is attracted, the article becomes an object of investment, and an advance forthwith ensues.

Much of the wheat on hand is however either of inferior quality or blighted, which has caused the millers to select only the better descriptions, and making these samples of higher relative value than the other sorts, which are thus left on the farmers' hands, who in some instances, not having any vent for the article, are obliged to use them for seed. France may be therefore said to have been favoured with a good harvest; but at present experiencing a deficiency in fine wheats for the millers' use, with a very limited stock of old wheat on hand; prices of the better sorts being more likely to advance than further recede, though the improvement may not be to any extent. As regards commerce, this is no doubt an unfavourable position; but the character of the trade is similar to that of 1834–35, and the business in grain has of late years been confined within so narrow a circle, that unless some serious causes occur from the intemperature of the climate or failure of the crops, which would have the effect of forcing an extension of the *radius*, there is little chance of the negociations in the article becoming more productive, either to the speculator or merchant, nor is the grower likely to experience an increase in the price of his produce, to compensate him for a deficiency in quantity or quality.

## II. HAMBURG REPORT.

In the upper districts of the Elbe, from whence the city of Hamburg draws the chief portion of its supplies of wheat, the produce of the past harvest in the *marks* has considerably exceeded an average crop, the weight good, ranging from 61 lb to 63½ lb per bushel; but the quality of the grain is hard and flinty, and inferior in colour to the growth of 1834. In the Duchy of Anhalt, and from the districts of the Saale, down which river large quantities of grain are transported into the Elbe to Magdeburg, the yield is barely equal to an average, but the grain in quality and colour is superior to the sample of he previous crop, and weighs 61 lb to 62 lb. In Mecklenburg and Holstein, he harvest promised abundantly, not only in those portions of the duchies which border the Elbe, but also those contiguous to the Baltic. The hopes, however, of the farmers were doomed to experience severe disappointment at the very period when they were about to reap the return of their anxious toil. A hurricane, unprecedented in its disastrous consequences to the agriculturist, pervaded the whole of these districts, more particularly the Danish Isles; and, for three days during August, committed serious devastation, reducing the crops much below an average. The weight, however, of the corn is heavy, from 62 ℔ to 63 ℔ per bushel, but the colour inferior to that of last year.—Rye is below an average; but the quality extremely fine. In the neighbourhood of Magdeburg and the Saale, Barley has proved more productive than last year, and the quality more kindly, but not weighing more than 50 ℔; in Mecklenburg the return is fully an average, though in Holstein the crop is deficient nearly one-fourth. In both provinces, the quality is nearly equal to the fine sample of the previous year, and weighs 51 ℔ to 53 ℔. Oats have yielded a larger quantity, and much better quality, than last harvest, averaging in weight 39 ℔ to 40 ℔ in the Danish Islands; 58 ℔ to 39 ℔ on the Baltic coast of Holstein and Schleswick; on the Elbe side, and in Jutland, white qualities weigh 37 ℔ to 38 ℔, and black 38 ℔ to 39 ℔. The stocks being generally exhausted, the article has not receded in value so much as might otherwise have been expected.—Beans, though they suffered from the gales of wind before alluded to, are nearly an average crop, and, for the most part, equal to the sample of last harvest; many being handsome and in good condition; their low currency, which has been 4s. Sterling below that of the past season, added to their low value compared with other produce, has induced the farmers to apply the article as cattle-food.—Peas are a plentiful crop in Mecklenburg, and a fair average in the Upper and Lower Elbe; the quality fine and even.—Tares good in quality, and the quantity exceeding the growth of last year.—Linseed has not yielded, in the marsh lands, so much as last year; but the cultivation of the article is increasing in the Baltic part of Holstein and the Danish Islands.—Rapeseed, in the marshes of Holstein and Hanover, has produced an average growth; but inland, in Holstein and Schleswick, as well as throughout Denmark, it has hardly exceeded half a full average. This deficiency, however, has been counteracted by the additional quantity grown in Mecklenburg, Pomerania, and Prussia, in which countries the yield has surpassed the general exportation; and the shipments from Hamburg have, in consequence, been in the present season on a more extensive scale than usual.—Throughout Bohemia, Silesia, and most parts of Germany, the crops of white Clover-seed has proved almost a total failure, and the quality very inferior: red seed is likewise below an average, and the quality not so good as that of 1834; prices have, in consequence, ruled extremely high, fine new red having realised 52/ to 53/, and white 67/ to 69/6 ℘ cwt. In the corn-growing districts of the Elbe, and lower parts of the Baltic, the stocks of wheat at the commencement of the year were less than in 1834; and at Hamburgh, the diminution amounted to 22,000 quarters, which, in combination with the fact, that an accumulation of capital has arisen in these portions of the Continent, from the augmented production of rapeseed, linseed, and wool, the prices of wheat are not likely to be much depressed, as the pecuniary means of the agriculturists relieve them from the necessity of sending to the various markets larger supplies than the demand will clear off, enabling them to hold their stocks for a more favourable conjuncture.

## MISCELLANEOUS NOTICES.

*James Hogg the Ettrick Shepherd.*—We cannot allow so extraordinary a man as James Hogg to pass from among us without such notice as may, at least, bear witness that we are not insensible to the loss; but, in truth, the very full and able judgment passed on his literary character by Mr Cunningham in the *Sketch of English Literature*, leaves us little to do but express our deep regret. He was, we believe, in his sixty-third year; we may add on his own authority, that he was born on the 25th January 1772, the birth-day of Robert Burns; but there has been so much harmless mystification on this subject, that we are by no means certain that it is the fact. Hogg, as he delighted to tell the world, was born a shepherd; the son of many generations of shepherds; yet, humble as was his parentage, it was not beyond the reach of misfortune; and, at six years of age, "Jamie the Poeter," as he was subsequently called, was obliged to get his own living, and, for this purpose, engaged himself to herd cows to a neighbouring farmer; an occupation which he describes as the lowest in Scotland, yet not without its romance, as some of the anecdotes of his early life can bear witness. Here is one worth repeating: "That summer, when only eight years of age, I was sent out to a height called Broad-heads, with a rosy-cheeked maiden, to herd a flock of new-weaned lambs, and I had my mischievous cows to herd besides. But, as she had no dog, and I had an excellent one, I was ordered to keep close by her. Never was a master's orders better obeyed. Day after day I herded the cows and the lambs both, and Betty had nothing to do but to sit and sew. Then we dined together every day at a well near the Shiel-side head, and after dinner I laid my head down in her lap, covered her bare feet with my plaid, and pretended to fall sound asleep. One day I heard her say to herself,—'Poor little laddie! he's joost tired to death,' and then I wept till I was afraid she would feel the warm tears trickling on her knee. I wished my master, who was a handsome young man, would fall in love with her and marry her, wondering how he could be so blind and stupid as not to do it. But I thought if I were he, I would know well what to do."' As to learning, it fell not to his share, nor came within the compass of his thoughts—except, indeed, learning the fiddle, which seems to have been an early passion. "It was in my eighteenth year," he observes, "that I first got a perusal of '*The Life and Adventures of Sir William Wallace*,' and '*The Gentle Shepherd*;' and though immoderately fond of them, yet (what you will think remarkable in one who has since dabbled so much in verse) I could not help regretting deeply that they were not in prose, that everybody might have understood them; or, I thought, if they had been in the same kind of metre with the Psalms, I could have borne with them. The truth is, I made exceedingly slow progress in reading them. The little reading that I had learned I had nearly lost, and the Scottish dialect quite confounded me; so that before I got to the end of a line, I had commonly lost the rhyme of the preceding one; and if I came to a triplet, a thing of which I had no conception, I commonly read to the foot of a page without perceiving I had lost the rhyme altogether. I thought the author had been straitened for rhymes, and had just made a part of it to do as well as he could without them." It was six years after that he attempted to write. 'I had no more difficulty in composing songs then than I have at present; and I was equally well pleased with them. But, then, the writing of them!—that was a job! I had no method of learning to write, save by following the Italian alphabet; and though I always stripped myself of coat and vest when I began to pen a song, yet my wrist took a cramp, so that I could rarely make above four or six lines at a sitting." Indeed, with the exception of a few songs and ballads, Hogg was four or five-and-thirty before he was known as a writer, but then he burst forth at once with '*The Mountain Bard*,' and, to take his own (and we have no doubt correct) report, 'that celebrated work, '*Hogg on Sheep*.'" He has ever since been constantly before the public. "Several of these compositions," says Mr Cunningham, speaking of '*The Mountain Bard*,' "were of great merit; '*Gilmanscleuch*' has much tenderness and simplicity; and the wild tale of '*Willie Wilkins*' aspires to the '*Glenfinlas*' of Scott. The description of the spectre horses is surpassed by nothing in ballad verse. The hero of the story went to a meeting of warlocks, witches, and evil spirits, held in an old churchyard at midnight; his mother, a devout woman, followed and was astonished at finding her son's horse standing in a rank of gigantic coursers, among which he seemed but as a foal. She stretched her hands out to stroke their mighty sides, and perceived, to her horror, that they were spectral, for every wave that she gave her arms, a gap was left behind." Hogg was, undoubtedly, a man of fine original genius. "*The Queen's Wake*," his most celebrated work, is full of fancy, and, though unequal, is studded throughout with beauties. We incline, however, to think, that there is more truth than was intended in what Mr Cunningham observes, that Mr Hogg's genius "seems the natural offspring of the pastoral hills and dales of the border"—that there is, in fact, a national tone and feeling in his writings, with which we southrons do not wholly sympathize—that, in consequence, Mr Hogg was more commended than read by Englishmen, and that his English fame is attributable to the fine things said for him, and the hearty cordial spirit which animates him in the dramatic scenes of the *Noctes*. At the same time let us acknowledge that this hearty cordial spirit was characteristic of him. It was our good fortune to meet him frequently during his visit to London, and a more simple unaffected man we never associated with; he carried his heart in his hand; he had the trusting confidence of a child. From many scattered passages in Hogg's autobiographies, it would appear, that he kept a somewhat voluminous journal; if so, it will now, no doubt, be published, and we may, therefore, be allowed to express a hope, that a discreet friend will be permitted to look over the manuscript—that it will not be sent "unhousel'd unanointed' before the public. Hogg was too open-hearted, and too much the creature of impulse, to rest with confidence on his momentary judgment.—*Athenæum*.

## QUARTERLY AGRICULTURAL REPORT.

*February* 1836.

If variety were always pleasing, the bygone winter quarter should have been the pleasantest of any for many years. Rain and sleet, frost and snow, wind and calm, storm and tempest, heat and cold, have succeeded each other, and many of them in the same day, with the most endless variety; and yet this winter has been much more disagreeable to the feelings than the mild winters, "the green yules" of past years.

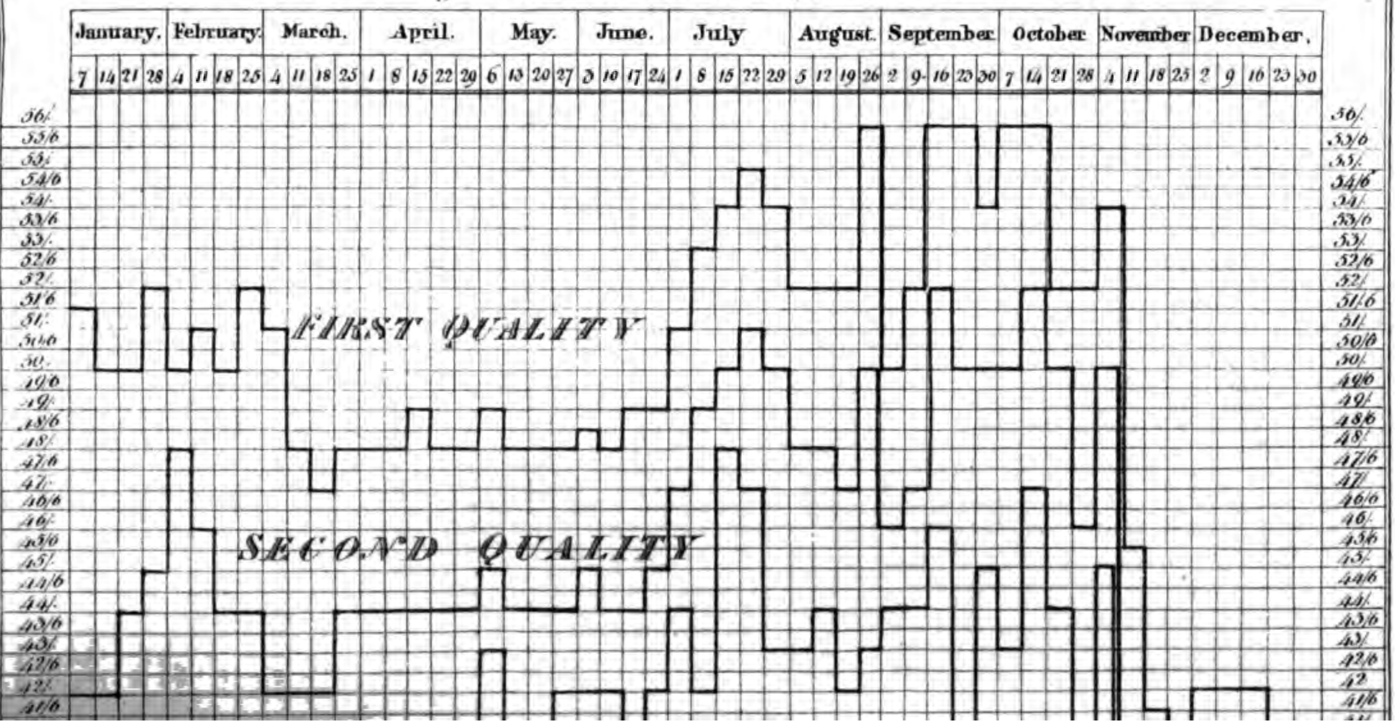
Our limited space will not permit us to expatiate on rural matters in this report. Suffice it to say, that the young wheat, especially on strong land, is backward and even sickly in many instances, owing, in the first instance, to the unfavourable state of the land at seed-time, and the subsequent very changeable weather. As was anticipated, turnips have not endured much eating, but nevertheless it is expected that stock will pay well for their keep, having been bought in at a reasonable rate in autumn, and prices assuming a firm aspect for the spring. Indeed, prices of all farm-produce advance, even of wheat, the "deferred hopes" on which have already been sufficient to make the "heart sick." The advancement in prices may partly be ascribed to the brisk state of trade, but more we suspect, at present, to the great loss in sheep in England from rot, the total failure of the turnip having rendered it necessary that the whole sheep stock should be supported on winter pasture. We shall anxiously wait the appearance of the Report of the Committee of the House of Commons, appointed to inquire into the distressed state of Agriculture. The inquiry is to be left unfettered, but the Committee are desired not to express their opinion on the effects of the working of the present standard of currency. The restriction we conceive to be impolitic, because a reserved silence on that point will cause it to be inferred by many people that the present standard has caused much greater mischief than the House of Commons is willing to acknowledge. It is more befitting a British Legislature openly to announce whatever may have been *proved*, or have failed to be proved by evidence on that difficult and momentous subject. In the Committee declining to take this step, the currency will assuredly form a constant theme for agitation. We strongly recommend to the attention of our readers a small work, entitled, "Reasons and Plans for the Encouragement of Agriculture," which is written not only with ability and good sense, but reasons on important facts in that calm, philosophical spirit which impresses conviction of the justness of the views of the writer. We hope Messrs Clowes and Sons will send it to us regularly through Mr Cadell.

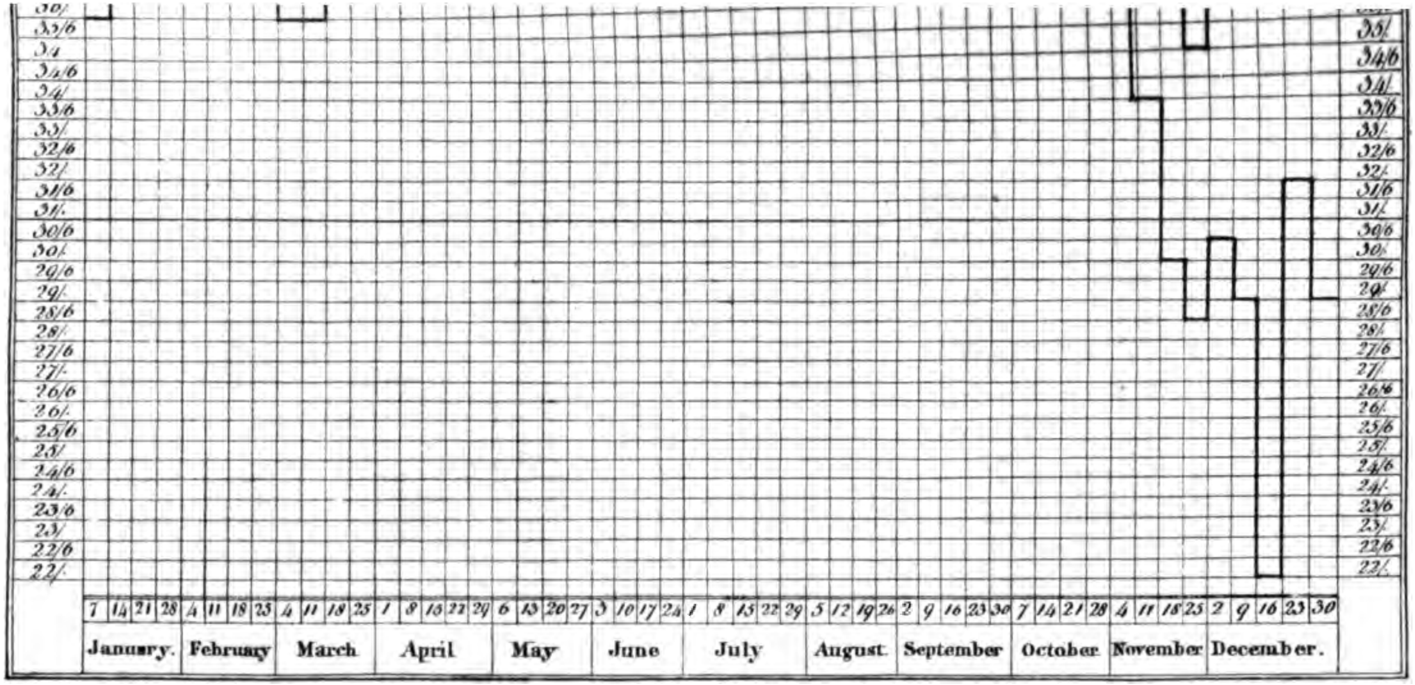
## THE REVENUE.

*ABSTRACT of the Net Produce of the Revenue of Great Britain, in the Quarters and Years ended on the 5th of January* 1835, *and 5th of January* 1836,—*showing the Increase and Decrease on each head thereof.*

| | Quarters ended Jan. 5. | | Increase. | Decrease. | Years ended Jan. 5. | | Increase. | Decrease. |
|---|---|---|---|---|---|---|---|---|
| | 1835. | 1836. | | | 1835. | 1836. | | |
| | £ | £ | £ | £ | £ | £ | £ | £ |
| Customs, .. | 4,305,721 | 4,520,415 | 214,694 | .. | 16,936,695 | 18,622,906 | 1,686,211 | .. |
| Excise,.... | 3,484,200 | 3,347,763 | .. | 136,437 | 13,166,055 | 11,544,760 | .. | 1,621,295 |
| Stamps,... | 1,555,462 | 1,619,547 | 64,085 | .. | 6,582,234 | 6,569,309 | .. | 12,925 |
| Post-Office, | 323,000 | 345,000 | 22,000 | .. | 1,361,800 | 1,418,000 | 57,000 | .. |
| Taxes,.... | 1,633,120 | 1,575,646 | .. | 57,474 | 4,550,614 | 3,676,523 | .. | 874,091 |
| Miscellaneous, | 38,447 | 21,576 | .. | 16,871 | 56,919 | 59,866 | 2,947 | .. |
| | 11,339,950 | 11,429,947 | 300,779 | 210,782 | 42,654,317 | 41,891,364 | 1,746,158 | 2,508,31 |
| | Deduct Decrease, . . | | 210,782 | | Deduct Increase, | | | 1,746,15 |
| | Increase on the quarter, | | 89,997 | | Decrease on the year, | | | 762,15 |

## *TABLE showing the Price Per Quarter of the First, Second & Third Qualities of* **WHEAT**, *in the Edinburgh Market from 1st January, to 31st December 1835.*





*Explanation.* This Table shews the Price Per Quarter of the three different qualities on each Market-day, during the year. To find the price for any day, find the date at the top or bottom of the Table; and on either side, in a straight line with that part of the thick black line which cuts the column at the top of which the date stands, the price will be found.

*Example.* — To find the price on the 22nd of July, — find the date at the top of the Table, and on the 3rd line underneath, will be seen, the thick horizontal line, this being carried out to the margin will shew the price of the first quality to have been on that day 55/. — further down, the price of the second quality will be found to have been 51/.; and still lower down in the Table the price of the third quality to have been 47/.

## TABLES OF PRICES, &c.

***The Average Prices of the different kinds of GRAIN, per Imperial Quarter, sol***
***following Markets :—***

### LONDON.

| Date. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Nov. 6. | 38 6 | 28 4 | 19 9 | 30 4 | 35 0 | 34 11 |
| 13. | 40 0 | 31 3 | 19 7 | 28 11 | 34 6 | 35 1 |
| 20. | 39 6 | 30 8 | 19 11 | 28 6 | 36 6 | 35 5 |
| 27. | 39 11 | 31 4 | 19 7 | 29 6 | 37 2 | 36 7 |
| Dec. 4. | 39 10 | 29 10 | 19 3 | 30 8 | 37 0 | 36 0 |
| 11. | 38 9 | 28 9 | 19 6 | 29 6 | 35 10 | 33 8 |
| 18. | 40 0 | 29 2 | 19 11 | 28 0 | 35 6 | 34 2 |
| 25. | 38 2 | 28 6 | 20 3 | 27 4 | 34 0 | 31 5 |
| 1836. | | | | | | |
| Jan. 1. | 38 6 | 28 1 | 19 9 | 25 3 | 33 8 | 31 10 |
| 8. | 38 4 | 28 6 | 19 10 | 27 0 | 33 6 | 32 9 |
| 15. | 39 4 | 28 4 | 20 2 | 26 6 | 34 5 | 32 6 |
| 22. | 39 0 | 29 2 | 20 0 | 26 0 | 34 8 | 33 7 |
| 29. | 42 0 | 29 9 | 21 1 | 27 0 | 34 0 | 33 7 |

### DUBLIN.

| Date. | Wheat Per Bar. 20 St. | Barley Per Bar. 16 St. | Bear Per Bar. 17 St. | Oats Per Ba 14 St. |
|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. |
| Nov. 6. | 18 6 | 13 0 | 10 2 | 9 3 |
| 13. | 18 9 | 13 2 | 10 2 | 9 0 |
| 20. | 18 11 | 13 6 | 10 0 | 9 4 |
| 27. | 19 2 | 13 4 | 10 3 | 9 0 |
| Dec. 4. | 19 6 | 13 10 | 10 6 | 8 6 |
| 11. | 20 6 | 13 6 | 10 8 | 8 10 |
| 18. | 19 9 | 14 0 | 10 2 | 9 2 |
| 25. | 20 0 | 14 4 | 10 8 | 9 8 |
| 1836. | | | | |
| Jan. 1. | 20 6 | 14 0 | 11 6 | 9 6 |
| 8. | 21 6 | 14 6 | 11 6 | 9 3 |
| 15. | 23 0 | 15 0 | 11 9 | 10 0 |
| 22. | 24 0 | 15 3 | 12 6 | 10 6 |
| 29. | 24 3 | 15 9 | 12 6 | 10 6 |

### LIVERPOOL.

| Date. | Wheat. | Barley. | Oats. | Rye. | Pease. | Beans. |
|---|---|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Nov. 6. | 34 3 | 27 11 | 18 11 | 29 6 | 36 2 | 37 1 |
| 13. | 34 8 | 24 11 | 18 1 | 30 8 | 37 5 | 37 8 |
| 20. | 36 4 | 28 0 | 18 6 | 29 3 | 36 3 | 36 9 |
| 27. | 36 9 | 27 9 | 18 9 | 28 4 | 37 9 | 38 9 |
| Dec. 4. | 36 4 | 26 10 | 18 11 | 28 9 | 38 0 | 38 0 |
| 11. | 37 3 | 31 6 | 18 9 | 29 10 | 38 6 | 39 0 |
| 18. | 36 2 | 26 3 | 18 4 | 30 4 | 37 2 | 37 3 |
| 25. | 36 10 | 25 9 | 19 1 | 29 6 | 37 0 | 38 3 |
| 1836. | | | | | | |
| Jan. 1. | 35 9 | 20 6 | 18 10 | 32 2 | 37 4 | 37 2 |
| 8. | 38 9 | 26 0 | 18 11 | 30 6 | 37 6 | 38 0 |
| 15. | 37 4 | 30 1 | 18 6 | 30 0 | 36 6 | 38 3 |
| 22. | 39 10 | 27 6 | 19 6 | 29 8 | 35 8 | 38 5 |
| 29. | 39 9 | 27 10 | 19 10 | 28 0 | 34 10 | 38 7 |

### EDINBURGH.

| Date. | Wheat. | Barley. | Oats. | Pease |
|---|---|---|---|---|
| 1835. | s. d. | s. d. | s. d. | s. d. |
| Nov. 4. | 44 0 | 28 6 | 24 0 | 38 0 |
| 11. | 40 6 | 28 0 | 22 10 | 38 0 |
| 18. | 38 6 | 26 0 | 20 9 | 36 8 |
| 25. | 35 6 | 27 7 | 20 7 | 34 0 |
| Dec. 2. | 35 0 | 26 0 | 20 2 | 33 0 |
| 9. | 36 1 | 26 4 | 20 0 | 33 6 |
| 16. | 36 2 | 27 0 | 20 6 | 33 8 |
| 23. | 36 6 | 27 2 | 21 1 | 33 6 |
| 30. | 36 6 | 26 7 | 20 3 | 33 0 |
| 1836. | | | | |
| Jan. 6. | 37 3 | 28 0 | 22 0 | 33 8 |
| 13. | 38 2 | 28 0 | 22 6 | 33 6 |
| 20. | 38 4 | 27 8 | 22 1 | 33 4 |
| 27. | 39 6 | 28 0 | 22 0 | 33 6 |

***TABLE shewing the Weekly Average Prices of GRAIN, made up in terms of 7***
***Geo. IV. c. 58, and the Aggregate Averages which regulate the Duties payable on F***
***CORN; the Duties payable thereon, from November 1835 to February 1836.***

| Date. | Wheat. | | | Barley. | | | Oats. | | | Rye. | | | Pease. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly Average. | Aggregate Average. | Duty. | Weekly |
| 1835. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. |
| Nov. 6. | 36 7 | 36 10 | 50 8 | 28 6 | 28 5 | 19 10 | 19 2 | 19 7 | 18 3 | 30 1 | 29 9 | 25 9 | 35 5 | 35 8 | 16 9 | 35 |
| 13. | 36 7 | 36 9 | 50 8 | 29 3 | 28 7 | 19 10 | 18 11 | 19 5 | 18 3 | 26 4 | 29 0 | 25 9 | 35 9 | 35 8 | 16 9 | 35 |
| 20. | 36 10 | 36 9 | 50 8 | 29 5 | 28 10 | 19 10 | 18 11 | 19 3 | 18 3 | 28 11 | 28 9 | 27 3 | 36 2 | 35 9 | 16 9 | 35 |
| 27. | 36 11 | 36 9 | 50 8 | 29 3 | 29 0 | 18 4 | 19 0 | 19 2 | 18 3 | 29 7 | 28 8 | 27 3 | 36 8 | 35 10 | 16 9 | 35 |
| Dec. 4. | 36 9 | 36 8 | 50 8 | 29 0 | 29 0 | 18 4 | 18 11 | 19 1 | 18 3 | 30 10 | 29 2 | 25 9 | 34 9 | 35 10 | 16 9 | 35 |
| 11. | 36 8 | 36 9 | 50 8 | 28 2 | 28 11 | 19 10 | 18 7 | 18 11 | 19 9 | 28 0 | 28 11 | 27 3 | 35 7 | 35 9 | 16 9 | 34 |
| 18. | 36 6 | 36 8 | 50 8 | 27 4 | 28 5 | 19 10 | 18 8 | 18 9 | 19 9 | 27 8 | 28 7 | 27 3 | 34 6 | 35 6 | 16 9 | 33 |
| 25. | 36 0 | 36 9 | 50 8 | 27 7 | 28 9 | 19 10 | 18 6 | 18 10 | 19 9 | 24 5 | 28 0 | 27 3 | 35 4 | 35 9 | 16 9 | 34 |
| 1836. | | | | | | | | | | | | | | | | |
| Jan. 1. | 36 0 | 36 6 | 50 8 | 27 4 | 28 1 | 19 10 | 18 7 | 18 8 | 19 9 | 27 7 | 28 4 | 27 3 | 34 5 | 35 3 | 16 9 | 33 |
| 8. | 36 6 | 36 5 | 50 8 | 27 8 | 27 10 | 19 10 | 18 7 | 18 8 | 19 9 | 27 0 | 27 11 | 28 9 | 34 3 | 34 10 | 18 3 | 33 |
| 15. | 37 0 | 36 5 | 50 8 | 28 1 | 27 8 | 19 10 | 18 9 | 18 7 | 19 9 | 25 8 | 27 0 | 28 9 | 34 5 | 34 9 | 18 3 | 33 |
| 22. | 37 10 | 36 8 | 50 8 | 28 9 | 27 9 | 19 10 | 18 11 | 18 8 | 19 9 | 27 0 | 27 7 | 28 9 | 34 0 | 34 6 | 18 3 | 33 |
| 29. | 39 3 | 37 1 | 49 8 | 28 11 | 28 0 | 19 10 | 19 6 | 18 10 | 19 9 | 26 0 | 26 11 | 30 3 | 33 6 | 34 2 | 18 3 | 33 |

*The MONTHLY RETURNS, published in terms of 9th Geo. IV. c. 60, showing the Q Corn, Grain, Meal, and Flour imported into the United Kingdom in each Month; the upon which duties have been paid for home-consumption, during the same Month; and tities remaining in Warehouse at the close thereof: from 5th Nov.* 1835 *to 5th Jan.* 18

| Month ending | IMPORTED. | | | CHARGED WITH DUTY. | | | REMAINING IN W | |
|---|---|---|---|---|---|---|---|---|
| | From Foreign Countries. | From British Possessions. | Total. | From Foreign Countries. | From British Possessions. | Total. | From Foreign Countries. | From British Possessions. |
| Nov. 5. 1835. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu. | Qrs. Bu |
| heat, . . | 1,114 7 | 510 0 | 1,624 7 | 2 1 | 1,029 3 | 1,031 4 | 572,224 7 | 48,139 5 |
| ley, . . | 2 0 | .. | 2 0 | 22 6 | .. | 22 6 | 58,627 6 | 25 1 |
| s, . . | 8,062 2 | .. | 8,062 2 | 44 7 | .. | 44 7 | 241,304 5 | 666 0 |
| e, . . . | .. | .. | .. | .. | .. | .. | 3,476 3 | .. |
| se, . . | 845 6 | 1 4 | 847 2 | 409 5 | 1 4 | 411 1 | 6,296 0 | .. |
| ns, . . | 236 0 | .. | 236 0 | 0 1 | .. | 0 1 | 1,738 7 | .. |
| Totals, . | 10,260 7 | 511 4 | 10,772 3 | 479 4 | 1,030 7 | 1,510 3 | 888,598 4 | 48,830 6 |
| . 5. | | | | | | | | |
| t, . . | 1,698 2 | 28 0 | 1,726 2 | 7 5 | 1,681 2 | 1,688 7 | 568,104 2 | 46,650 3 |
| ley, . . | .. | .. | .. | 13 7 | .. | 13 7 | 54,694 4 | 25 1 |
| s, . . | 2,272 3 | .. | 2,272 3 | 18 5 | .. | 18 5 | 238,651 4 | 666 0 |
| e, . . . | .. | .. | .. | .. | .. | .. | 3,450 3 | .. |
| se, . . | 541 5 | 80 0 | 621 5 | 131 2 | 80 0 | 211 2 | 6,952 0 | .. |
| Beans, . . | 205 7 | .. | 205 7 | 0 1 | .. | 0 1 | 1,942 6 | .. |
| Totals, . | 4,718 1 | 108 0 | 4,826 1 | 171 4 | 1,761 2 | 1,932 6 | 873,785 3 | 47,341 4 |
| 5. 1836. | | | | | | | | |
| at, . . | 0 3 | 525 0 | 525 3 | 0 3 | 244 4 | 244 7 | 563,859 2 | 46,832 1 |
| y, . . | .. | .. | .. | 24 3 | .. | 24 3 | 51,791 5 | 25 1 |
| s, . . | 464 2 | .. | 464 2 | .. | .. | .. | 237,485 1 | 666 0 |
| Rye, . . . | .. | .. | .. | .. | .. | .. | 3,450 3 | .. |
| se, . . | 1,044 2 | 4 4 | 1,048 6 | 146 7 | 4 4 | 151 3 | 7,739 5 | .. |
| ns, . . | 409 0 | .. | 409 0 | 46 3 | .. | 46 3 | 2,306 3 | .. |
| Totals, . | 1,917 7 | 529 4 | 2,447 3 | 218 0 | 249 0 | 467 0 | 866,632 3 | 47,523 |
| Nov. 5. 1835. | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. lb | cwt. qr. |
| Flour, . . | 1,204 0 24 | 542 1 20 | 1,746 2 16 | 31 3 24 | 4,040 0 22 | 4,072 0 18 | 250,585 1 23 | 20,694 1 1 |
| Oatmeal, . | 5 3 24 | .. | 5 3 24 | .. | .. | .. | 75 1 8 | .. |
| Totals, . | 1,210 0 20 | 542 1 20 | 1,752 2 12 | 31 3 24 | 4,040 0 22 | 4,072 0 18 | 250,660 3 3 | 20,694 1 1 |
| ec. 5. | | | | | | | | |
| ur, . . | 6,305 2 9 | 1,627 2 2 | 7,933 0 11 | 29 2 25 | 3,479 3 8 | 3,509 2 5 | 243,281 0 15 | 20,775 1 1 |
| meal, . | .. | .. | .. | .. | .. | .. | 75 1 8 | .. |
| Totals, . | 6,305 2 9 | 1,627 2 2 | 7,933 0 11 | 29 2 25 | 3,479 3 8 | 3,509 2 5 | 243,356 1 23 | 20,775 1 1 |
| . 5. 1836. | | | | | | | | |
| ur, . . | 8,523 0 23 | 3,401 2 17 | 11,924 3 12 | 13 2 11 | 2,711 1 22 | 2,725 0 5 | 234,795 1 22 | 21,537 1 1 |
| meal, . | 0 0 3 | .. | 0 0 3 | 0 0 3 | .. | 0 0 3 | 75 1 8 | .. |
| Totals, . | 8,523 0 26 | 3,401 2 17 | 11,924 3 15 | 13 2 14 | 2,711 1 22 | 2,725 0 8 | 234,870 3 2 | 21,537 1 1 |

## *PRICES of BUTCHER-MEAT.*

| | SMITHFIELD, *Per Stone of* 14 lb. | | MORPETH, *Per Stone of* 14 lb. | | EDINBURGH, *Per Stone of* 14 lb. | | GLA *Per Stone* |
|---|---|---|---|---|---|---|---|
| Date. | Beef. | Mutton. | Beef. | Mutton. | Beef. | Mutton. | Beef. |
| 1835.<br>Nov. | 6/3 @ 7/3 | 6/6 @ 7/6 | 6/ @ 7/ | 6/3 @ 7/ | 6/ @ 6/9 | 6/3 @ 6/9 | 6/6 @ 6/9 |
| Dec. | 6/6 7/6 | 6/9 7/6 | 6/3 7/6 | 6/6 7/6 | 6/3 6/9 | 6/6 7/ | 6/6 7/ |
| 1836.<br>Jan. | 7/ 8/ | 7/3 8/0 | 7/3 7/9 | 7/ 7/9 | 6/9 7/6 | 6/9 7/3 | 6/9 7/6 |

## *PRICES of English and Scotch WOOL.*

ENGLISH, per 16 lb.—*Merino*, Washed, 28/6 @ 32/6; in Grease, 23/ @ 28/.—*South D*
*ester*, Hogg, 25/ @ 28/; Ewe and Hogg, 22/6 @ 26/.—*Locks*, 15/ @ 18/; *Moor*, 11/6 @ 14/.
COTCH, per 24 lb.—*Leicester*, Hogg, 44/ @ 48/; Ewe and Wedder, 37/ @ 42/.—Ewe, 33/6 @
ite, 27/ @ 32/; Washed, 22/ @ 25/; Laid, 20/ @ 21/; *Moor*, White, 14/6 @ 16/6; Laid, 11/

# INDEX.

ABERDEENSHIRE cattle, on the application of the points by which live-stock are judged to, 438—fiar prices of, for crop 1834, 159
Agriculture of the county of Limerick, 390—of the county of Wicklow, . . . . . 161
Aiton, Mr William, on reclaiming waste land, . . . . 319
Alderney and Guernsey cattle, application of the points by which live stock are judged to, . 568
Alnwick, manner of making persons free at, . . . . 305
America, North, review of Mr Shirreff's tour through, . . . 127
Angus cattle, on the application of the points by which live-stock are judged to, . . . 443
Aphides, systematic description of the British, . . . . 219
Argyllshire, fiar prices of, for crop 1834, . . . . . 159
Artichoke, on the culture of the, 542
Asparagus, on the culture of, . 534
Ayr, account of the Show of the Highland and Agricultural Society of Scotland at, . . 471
Ayrshire cattle, the application of the points by which live-stock are judged to, 555—fiar prices of, for crop 1834, . . 159

Banffshire, fiar prices of, for crop 1834, . . . . . 159
Berwickshire, fiar prices of, for crop 1834, . . . . . 159
Blackadder, Mr Alexander, on moss improvements, . . 482
Blacker, Mr William, on the advantages of small farms, . 185
Blight-bag, the British, . 226
Blood, what it is in breeding, . 280
Butcher-meat, prices of, at Smithfield, Morpeth, Edinburgh, and Glasgow, from February to April 1835, 158—from May to July, 318—from August to October, 496—from November 1835 to January 1836, . . . . 610
Buteshire, fiars price of, for crop 1834, . . . . 159
Caithness-shire, fiar prices of, for crop 1834, . . . . 159
Cattle, particular breeds of, in Scotland, recommended to be discouraged, . . . . 24
Clackmannanshire, fiar, prices of, for crop 1834, . . 159
Coal trade of Newcastle and Sunderland, . . . . 302
Cock, the Java, 374—Jungle, 376—domestic, 378—dunghil, 379—game, 380—Dorking, 380—Poland, 381—crested, 382—Hamburg, 383—Spanish, 383—Malay or Chittagong, 383—Bantam, 384—Turkish, 385—dwarf, 385—rumkin, 386—silky, 387—frizzled, 388—Negro, 389—Barbary, 389—Dutch, 389—Russian, 389

Dahlia, on the culture of the, . 72
Deccan, products of the . 247
Dickson, Mr James, on the application of the points by which cattle are judged to short-horns, 266—to the Shetland breed, 433—to the Orkney and Caithness breeds, 434—to the North Highland breed, 435—to the Aberdeenshire breed, 438—to the Angus breed, 443—to the Fife breeds, 546—to the West Highland breed, 548—to the Ayrshire breed, 555—to the Galloway breed, 559—to English breeds, 563—to Irish breeds, 565—to the Isle of Man breed, 567—to the Alderney and Guernsey breeds, . . . . 568
Dry rot, Kyan's infallible cure for the, . . . . . 145
Draining and embanking, review of Mr Johnstone's book on, 254—thoughts on the extension of, 325—moss, on the danger of over, 512—thoughts on, as the speediest means of fertilizing the soil, 515—different kinds of, 520—particular kinds of soils, the facility or difficulty of, . . . . 528
Dublin, prices of grain in, from 23d January to 20th April 1835, 157—from 1st May to 24th July,

317—from 31st July to 23d October, 495—from 6th November 1835 to 29th January 1836, . 609
Dumbartonshire, fiar prices of, for crop 1834, . . . 159
Dumfriesshire, fiar prices of, for crop 1834, . . . 159
Dunbar hiring markets, . 428

Edinburgh, prices of butcher meat at, from February to April 1835, 158—from May to July, 318—from August to October, 496—from November 1835 to January 1836, 610—prices of grain in, from 4th February to 29th April 1835, 157—from 6th May to 29th July, 317—from 5th August to 28th October, 495—from 4th November 1835 to 27th January 1°36, 609—tabular view of the different qualities of wheat in, during the year 1834, 156—during the year 1835, . . 608
Edinburghshire, fiar prices of, for crop 1834, . . . 159
Embanking, review of Mr Johnstone's systematic treatise on draining, &c. . . . 254
England and Scotland, comparison of the poor laws of, . . 1
English cattle, application of the points by which live-stock are judged to, . . . 563
English wool, prices of, . . 158, 318, 496, 610
Excretion from the roots of plants, on the, . . 133, 360

Fairs in Scotland, some account of, . . . . . 427
Farmers in Scotland, character of the small, . . . 516
Farms, on the advantages of small, 185
Fearnside, Mr William Gray, on the corn trade during 1835, in England, 446—in Scotland, 461—in Ireland, 463—in the Russian empire, ib.—in Prussia, Pomerania, and Poland, 465—in Mecklenburg, 466—in Denmark, ib. in Holland, 468—in France, ib.—in Italy, 470—in Van Diemen's Land, 471—at Swan River, ib.—in Canada, 543—in the United States, 544—the harvest in France, 603—at Hamburg, 604.
Fiar prices of the counties of Scotland from crop 1834, 159—in Forfarshire, from crop 1779, to crop 1834, both inclusive, . . 369
Fife cattle, the application of the points by which live stock are judged to . . . . 546
Fifeshire, fiar prices for crop 1834, 159
Foreign corn markets, . 156, 315
Forfarshire, fiar prices of, for crop 1834, 159—fiar prices from crop 1779 to crop 1834, both inclusive, . . . . . 369
Fowls, on the species and varieties of domestic, 372—which lay the greatest number, largest size, and highest flavoured eggs, 390—colour and delicacy of the flesh of, ib.
Flour, monthly returns of foreign, from 5th January to 5th April 1835, 158—from 5th May to 5th July, 318—from 5th August to 5th October, 496—from 5th November 1835 to 5th January 1836, . . . . 610
Flukes and their eggs in sheep, their structure and habitat, . 333
French cattle, application of the points by which live stock are judged to, . . . . 568

Galloway cattle, the application of the points by which live stock are judged to, . . . 559
Geological changes in Great Britain, . . . . 310
Gifford, fairs in, . . . 429
Glasgow, archbishopric of, fiar prices of, for crop 1834, 160—prices of, butcher meat at, from July to April 1835, 158—from May to July, 318—from August to October, 496—from November 1835 to January 1836, . 610
Gold of the county of Wicklow, . 162
Grain, average prices of in London, Dublin, Liverpool, and Edinburgh, from 3d February to 29th April 1835, 157—from 1st May to 29th July, 317—from 31st July to 28th October, 495—from November 1835 to January 1836, . . . 609
Grain, general weekly and aggregate averages of, foreign, from 1st February to 1st May 1835, 157—from 1st May to 1st August, 317—from 1st August to 1st November, 495—from 1st November 1835 to 1st February 1836, . . . . . 610
Grain, monthly returns of foreign, from 5th January to 5th April 1835, 158—from 5th May to 5th July, 318—from [illegible] August to 5th October, [illegible] 5th November 1835 to [illegible] January 1[illegible]

Graham, Mr Archibald, surgeon, H. E. I. C. S., on the means of ameliorating India, review of . 237
Greenhouse plants, on, . . 48, 346

Haddington markets, . . 427
Haddingtonshire, fiar prices for crop 1834, . . . . 160
Hay-making in the county of Wicklow, method of, . . 174
Heath, observations on the uses and management of, . . 42
Heriot, Esq. James, on the culture of the dahlia, . . . 72
Highland and Agricultural Society of Scotland at Ayr, account of the Show of the, . . 471
Highland cattle, North, on the application of the points by which live stock are judged to the, . 435
Highland, cattle, West, the application of the points by which live stock are judged to, . . 548
Hogg, James, the Ettrick Shepherd, . . . . . 606
Hogg, Mr William, observations on the uses and management of heath, 42—on the cause and rot in sheep, . . . 341
Honey-dew, erroneous theories of, and true mode of formation of, 207
Horses, account of an apparatus for steaming food for, . . . 33
Husbandry, on the application of steam to the purposes of, . 411

In-and-in, the evils of breeding, . 294
India, on the means of ameliorating, being a review of Mr Archibald Graham's book on that subject, 237—erroneous views taken by Europeans of, 240—state of the labouring people of, 243—system of education in, 250—agricultural superstitions of, 253
Indigo, substitute for, . . 306
Inverness-shire, fiar prices of, for crop 1834, . . . . 160
Ireland, duration of lease best suited to, . . . . . 181
Irish cattle, application of the points by which live stock are judged to, 565

Johnstone, Mr John, land-surveyor, Edinburgh, systematic treatise on draining and embanking, review of, . . . . 254

Kincardineshire, fiar prices of, for crop 1834, . . . . 160
King, Mr Edward, on the propogation of rot in sheep, . 331
Kinrosshire, fiar prices of, for crop 1834, . . . 160
Kirkcudbrightshire, fiar prices of, for crop 1834, . . . 160
Kyan, infallible cure for the dry-rot, 145

Lothian, East, some account of the fairs in, 427—wages of farm servants in, . . . . 428
Lambs for the Dublin market, method of breeding early in Wicklow, . . . . . 171
Lanarkshire, fiar prices of, for crop 1834, . . . . . 160
Lease best suited for Ireland, 181
Limerick, on the agriculture of the county of, 390—principal exports from the port of, . 408
Linlithgowshire, fiar prices of, for crop 1834, . . . . 160
Liverpool, prices of grain in, from 3d Feb. to 28th April 1835, 157—from 5th May to 28th July, 317,—from 4th Aug. to 27th Oct. 495—from Nov. 1835 to Jan. 1836, . . . 609
London, prices of grain in, from 30th Jan. to 24th April 1835, 157—from 1st May to 24th July, 317—from 31st July to 23d Oct., 495—from 6th November, 1835 to 29th January 1836, 609—mode by which it is supplied with strawberries, . . . 301

Malt-tax, effects of the repeal of the, . . . . . 152
Man, cattle of the Isle of, application of the points by which live stock are judged to, . . 567
Manure, on the usual mode of preparing it on farms, . . 104
Milkmaids, the city of Dort preserved by, . . . . 305
Milton, Mr John S., observations and experiments, proving the Parr or Brandling to be the young of a variety of salmon, . . 62
Micellaneous Notices: the Rohan potato, a new variety, 144—Kyan's infallible cure for dry-rot, 145—sunshine and shade, 150—the water of the Nile, 150—the mode by which London is supplied with strawberries, 301—the coal trade of Newcastle and Sunderland, 302—the city of Dort, in Holland, preserved by milkmaids, 305—manner of making persons free at Alnwick in Northumberland, 305--substitute for indigo, 306—Yucca gloriosa,

309—philosophical facts, 309—geological changes in Great Britain, 310—Scarlet trefoil, Trifolium incarnatum, 311—pin-making, 312—consumption of staple articles in England, 312—on moss improvements, by Mr Alexander Blackadder, land-surveyor and valuator, Allan Park, Stirling, 482—a cultivated moor, 485—on the failure of the potato crop, by a farmer, 486—foreign corn and flour trade, 489—Upton's rotatory lever engine and boiler, 491—James Hogg, the Ettrick Shepherd, . . . . 606
Moor, a cultivated, . . 485
Moray and Elgin, fiar prices of, for crop 1834, . . 160
Morpeth, prices of butcher-meat at, from Feb. to April 1835, 158—from May to July, 318—from August to October, 496—from November 1835 to January 1836, 610
Moss improvements, 482—subsoils of, 482—composition of proper, 483—depth, humidity and draining of, 483—manures for decomposing, 484—prospects of advantage by the improvement of, 484—on the danger of overdraining, 512

Nairnshire, fiar prices of, for crop 1834, . . . . 160
Nile, the water of the . . 150

Oatmeal, monthly returns of foreign from 5th January to 5th April 1835, 158—from 5th May to 5th July, 318—from 5th August to 5th October, 496—from 5th November 1835 to 5th January 1836, . . . . 610
Orkney and Caithness cattle, on the application of the points by which live stock are judged to, . 434
Parr, observations and experiments on the, proving it to be the young of a variety of the salmon, . 62
Paton, Mr William, on the degeneracy of the potato, . . 357
Peeblesshire, fiar prices of, for crop 1834, . . . 160
Perthshire, fiar prices of, for crop 1834, . . . . 160
Philosophical facts, . . 309
Physical Sciences, review of Mrs Somerville's book on the connexion of the, . . 138
Pin-making, . . . 312
Planting, on the management of belts of, . . . 113
Plant-lice, nature of British, 197—pairing and reproduction of, 198—fecundity and rapid increase of, 200—growth and changes of, 201—longevity and winter quarters of, 203—mouth-suckers and mode of feeding of, 204—destructive effects and ravages of, 206—excrementitious and other discharges of, 207—spreading and migration of, 209—natural enemies of, 211—artificial methods of destroying, 215—systematic description of British, . 219
Plants, on the excretion from the roots of, . . 133, 360
Plough, probable comparative cost of the horse and steam, . 418
Poor laws of England and Scotland, comparison of the, . . 1
Potato, the Rohan, a new variety, 144—on the degeneracy of the, 357—on the failure of the, containing remarks on the Messrs Macdonald prize essay, . 486
Potatoes, remarks upon theories on the failure of, . . 233

Quarterly agricultural report for May 1835, 151—for August, 313—for November, 402—for Feb. 1836, 608.

Renfrewshire, fiar prices of crop 1834, . . . . . 160
Rennie, Professor, on the British plant-lice, particularly those which are destructive to field and garden crops, . . 197
Report, quarterly agricultural, for May 1835, 151—for August, 313—for November, 492—for February 1836, . . . 608
Revenue, the, for quarter and year ending 5th April 1835, 159—5th July, 316—10th October 1835, 494—5th January 1836, . 608
Rhubarb, on the culture of, 541
Ross and Cromarty shires, fiar prices of for crop 1834, . . 160
Rot in sheep, on, 117, 228—on the propagation of, 331—the cause of, . . . . . 341
Roxburghshire, fiar prices of for crop 1834, . . . . 160
Russian empire, on the varieties of climate and productions in the, 497—of the region of ice, 499—the mossy region, 500—the region of forests and pasturage, 500—the region of barley and beginning of agriculture, 501—the region of rye and flax, or of settled agriculture, 501—the region of

wheat and fruit, 503—the region of maize and the vine, 508—the region of the olive-tree. the silk-worm, and the sugar-cane 511

Scarlet trefoil, the . . 311
Scotch wool, prices of, 158, 318, 496, 610
Scotland and England, comparison of the poor-laws of, . . 1
Scythe, cradle, on an improved method of mounting the . . 30
Sea-kale, on the culture of, . 538
Selkirkshire, fiar prices of, for crop 1834, . . . 160
Shade and sunshine, effects of, 150
Shannon, description of the river, 400
Sheep, on rot in, 117-228—on the propagation of the rot in, 331—flukes and their eggs, where situate in, 332—on the cause of rot in, . . . 341
Shirreff, Mr Patrick, review of his tour through North America, 127
Shetland cattle, on the application of the points by which live-stock are judged to, . . 433
Short-horns, on the application of the points by which live-stock are judged to, . . 266
Silk, Chinese method of winding raw, . . . . . 245
Sinclair, Sir John, of Ulbster, biographical memoir of, 569—his family, 570—birth, 571—education, 572—election to parliament, 573—his patriotic conduct in the famine of 1782, 574—his marriage, 576—his opinions on finance, 576—created a Baronet, 577—travels after the death of Lady Sinclair, 578—his improvements in Caithness-shire, 576—his exertions for the improvement of the fisheries, 588—is created Doctor of Laws, 592—institutes a society for the improvement of wool, 592—undertakes the national work of the Statistical Account of Scotland, . 594
Smithfield, prices of butcher-meat at, from Feb. to April 1835, 158—from May to July, 318—from August to October, 496—from November 1835 to January 1836, , . . . . 610
Somerville, Mrs, review of her book on the Connexion of the Physical Sciences, . . . 138
Statistics of Sweden, on the . 92
Steam to the purposes of husbandry, on the application of, . 411
Stephens, Mr George, on the statistics of Sweden, . . 92
Stirlingshire, fiar prices of, for crop 1834, . . . 160
Strawberries, the mode by which London is supplied with, . 301
Sunshine and shade, effect of, 150
Sutherlandshire, fiar prices of, for crop 1834, . . . 92
Sweden, on the statistics of, . 92

Thorough-draining recommended as the most generally applicable mode of effectually drying all soils, . . . . 329
Towers, Mr, on greenhouse plants, 48—remarks upon theories on the failure of potatoes, 233—on greenhouse plants, 346—on the excretion from the roots of plants, 360—on the culture of asparagus, 534—sea kale, 538—rhubarb, 541—the artichoke, . . 542

Upton's rotatory lever engine and boiler, . . . 491

Vegetation, gradual decrease of temperature, indicated by its influence on, . . . 142

Waste land, on reclaiming, . 319
Water of the Nile, the . . 150
Wheat, tabular view of the prices of the different qualities of, in the Edinburgh market in 1834, 156—in 1835, . . 608
Wicklow, agriculture of the county of, . . . . . 161
Wigtonshire, fiar prices of, for crop 1834, . . . 160
Wool, prices of, English and Scotch, 158, 318, 496, 610

Yucca gloriosa, the . . 309

---

PRINTED BY NEILL & CO., OLD FISHMARKET, EDINBURGH.

# PRIZE ESSAYS AND TRANSACTIONS

OF

# THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

# CONTENTS.

I. A GEOLOGICAL SURVEY OF BERWICKSHIRE. By DAVID MILNE, Esq. Advocate, Edinburgh, . Page 171

II. DESCRIPTION OF A SYRINGE FOR SMEARING AND BATHING SHEEP. By Mr ROBERT NISBETT, Innerleithen, . . . . 254

III. ACCOUNT OF THE VICIA VILLOSA, A SPECIES OF TARE NEW TO THIS COUNTRY. By Mr ARCHIBALD GORRIE, Annat Garden, . . 255

IV. ACCOUNT OF ALSIKE CLOVER (*TRIFOLIUM HYBRIDUM*). By Mr GEORGE STEPHENS, Land-Drainer, Edinburgh, . . . . 256

V. REPORT MADE TO HIS GRACE THE DUKE OF BUCCLEUCH AND QUEENSBERRY, RELATIVE TO THE AGRICULTURAL GARDEN FORMED AT SMEATON, IN DALKEITH PARK, BY ORDERS OF HIS GRACE. Communicated to the Highland and Agricultural Society of Scotland by directions of the Duke, . . 259

# CONTENTS

OF THE

# PRIZE ESSAYS AND TRANSACTIONS

OF

# THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

Page

I. On Forest Planting. By Mr John Grigor, Forres, 433

II. Report on the Plantations of Muirton. By lliam Mackenzie, Esq. of Muirton, . . . 468

III. Statement of an Experiment with Potatoes. By r Neil Menzies of Castle-Menzies, . . . 475

IV. On the Comparative Efficiency of Two Methods Thorough Draining, the one along, and the other ross, the Inclination of the Ground. By Mr James oung, Lesmahagow, . . . . . . 476

V. Description of a Wages-Reckoner. By Mr Alex-der Hogg, Kelso, . . . . . . 489

VI. Improvements in Thrashing-Mill Shakers, . 491

1. Cylinder Shaker. By Mr Archibald Ainslie junior, Peaston, East Lothian, . . . . . . . . 491
2. Skreen-Shaker. By Mr John Shennan, Lairdlaugh, Dumfriesshire, . . . . . . . . . 495

# THE
# QUARTERLY
# JOURNAL OF AGRICULTURE.

VOL. V.

MARCH 1834—MARCH 1835.

WILLIAM BLACKWOOD AND SONS, EDINBURGH;
AND T. CADELL, STRAND, LONDON.
MDCCCXXXV.

PRINTED BY NEILL AND CO.
OLD FISHMARKET, EDINBURGH.

# CONTENTS.

Page

I. The Practice of Fallowing, of Paring and Burning, of Irrigation, and of Draining, explained on new Scientific Principles. By James Rennie, A. M. Professor of Zoology, King's College, London, . 1

II. On the National Prejudices of the Farmers in Scotland, . 32

III. On Providing Schools for the Instruction of Farmers' Sons in the Physical Sciences. By Mr William Hawkins, Hitchin, Hertfordshire, . . . . . . . . . . . . 39

IV. A Historical Sketch of the Corn Laws. By John Cathcart, Esq. of Genoch, . . . . . . . . . 57

V. On Greenhouse Plants.—No. I. By Mr Towers, Author of the Domestic Gardener's Manual, . . . . . . 65

VI. On Galbraith's Mathematical and Astronomical Tables, . 83

Mathematical and Astronomical Tables, for the use of Students in Mathematics, Practical Astronomers, Surveyors, Engineers, and Navigators, &c. Second Edition, greatly Enlarged and Improved. By William Galbraith, A. M. Teacher of Mathematics, Edinburgh. Oliver & Boyd, Edinburgh.

VII. On the Application of Steam to Purposes of Husbandry, No. I. 84

VIII. On Machines for Bruising Grain for Horses, . . 100

IX. Statistics of Scotland, . . . . . . 112

New Statistical Account of Scotland.—No. I. Edinburgh: Blackwood, &c. 1834.

X. On Practical Irrigation and Draining, . . . . 129

The Practical Irrigator and Drainer. By Mr George Stephens, Land-Drainer, Edinburgh. Blackwood, 1834.

Note to our Readers, . . . . . . . 135

XI. Miscellaneous Notices.

I. Specimens of Rocks for the Museum of the Highland Society of Scotland, 135.—II. The Scotch Plough in France, 136.—III. Historical Sketch of the Months of January, February, and March, 137.—IV. Historical Sketch of the Holidays in the Months of January, February, and March, 140. V. Worms in Carrots, 144.—VI. Bee-House, 144.—VII. To Preserve Fruit for Exportation, 144.—VIII. Mice, 145.—IX. Vegetative Peculiarities in Durable and Soft-Wooded Trees in the Tropics, 145.—X. On the Increase of the Roots and the Stump in the Silver Fir long after it has been felled, 146.—XI. The Cheshire Cheese, 147.—XII. How to Keep Apples, 147.

XII. Quarterly Agricultural Report, . . . . . 148

XIII. Foreign Corn Markets, . . . . . . 154

Page

XIV. Tables of the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn; of the Revenue; Fiars Prices for Year and Crop 1833, . . . . . . . 155

XV. On the Points by which Live-Stock are judged. By Mr James Dickson, Cattle-Dealer, Edinburgh, . . . . . 159

XVI. On decomposed Salt as a Manure, . . . 169

An Address to the Landed Interest on the important discovery of the Decomposition of Salt for the purpose of Manure. By Mr Henry Kemp. Ridgway & Son, London, 1834.

XVII. On the Agriculture of the County of Carlow, . . 178

XVIII. The Swan River Settlement, . . . . 197

Extracts from the Letters and Journals of George Fletcher Moore, Esq. now filling a Judicial Office at the Swan River Settlement. Edited by Martin Doyle. 18mo, 1834.

XIX. On the Nature and Qualities of Humin and Humic Acid. By Mr Towers, Author of The Domestic Gardener's Manual, 205

XX. On Under-Ground Draining, . . . . . 232

XXI. Remarks on a New Theory of Fallowing. By Mr Main, Chelsea, . . . . . . . . . . 241

XXII. On the Mode of Fattening Calves in Strathaven. By Mr Aiton, Hamilton, . . . . . . . . . 249

XXIII. On Hippopathology, . . . . . . 257

Hippopathology: a Systematic Treatise on the Disorders and Lamenesses of the Horse, &c. By William Percival, M. R. C. S., Veterinary Surgeon in the First Life Guards, &c. Vol. i. pp. 331. London, 1834.

XXIV. On the Elements of Agriculture, . . . 268

Elements of Practical Agriculture, comprehending the Cultivation of Plants, the Husbandry of the Domestic Animals, and the Economy of the Farm. By David Low, Esq. F. R. S. E., Professor of Agriculture in the University of Edinburgh. Bell and Bradfute, Edinburgh. 1 vol. 8vo. 1834.

XXV. Some Account of the Fairs in Scotland, . . 276

No. I. Borders of Northumberland and Berwickshire. ib.

XXVI. Miscellaneous Notices,

I. Historical Sketch of the Months of April, May, and June, 298.—II. Historical Sketch of the Holidays in the Months of April, May, and June, 300.—III. Experiments on Gases hurtful to Vegetation, 301.—IV. Preserving Bees in Winter, 302.—V. Reason of Cats alighting on their feet in falling, ib.—VI. On the Geography of Plants, 303.—VII. Ingenious Invention for making Candles, 306.—VIII. On the Aphis, &c. ib.—IX. How to Shoe a Vicious Horse, 309.—X. On the Presence of Carbon in Living Plants, ib.—XI. Outline of the Geological History of Common Salt, 310.—XII. On Trenching Ground, 311.

Page
XXVII. Quarterly Agricultural Report, . . . . 311
XXVIII. Foreign Corn Markets, . . . . . 318
XXIX. Tables of the Revenue, the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn, &c. . ib.
XXX. On the Potato. By Mr Robert S. M'Adam, Belfast, . 321
XXXI. On the recent Failures of the Potato Crop, . . 344
XXXII. On mounting the Scythe with the Bow or the Rake. By the Rev. James Farquharson, Alford, Aberdeenshire, . . 346
XXXIII. On the making of Butter and Cheese in the Dairy District of Scotland. By Mr William Aiton, Hamilton, . . 350
XXXIV. Some Account of the Fairs in Scotland. No. II. Roxburghshire, . . . . . . . . . . . 366
XXXV. On the Hiring Markets in the Counties of Northumberland, Berwick, and Roxburgh, . . . . . . 379
XXXVI. On the Management of Landed Property and Small Farms in Ireland, . . . . . . . . 386

Prize Essay addressed to the Royal Dublin Society, on the Management of Landed Property in Ireland, &c. By William Blacker, Esq. Armagh. Dublin: W. Curry jun. & Co. 1834.

An Essay on the Improvement to be made in the Cultivation of Small Farms, by the Introduction of Green Crops, and House-Feeding the Stock thereon. By William Blacker, Esq. Armagh. Dublin: W. Curry jun. & Co. 1834.

XXXVII. On the Probable Causes of the Diseases of the Larch in Great Britain. By M. De Candolle, Geneva, . . . 403
XXXVIII. On Acute Dysentery in Sheep; and on Inflammation of the Abomasum, or True Stomach, in Cattle. By Mr William Dick, Veterinary Surgeon, Edinburgh, . . . . . 411
XXXIX. On Lawson's Agricultural Museum in Edinburgh, . 418
XL. Account of the Great Agricultural Meeting, and General Show of Live Stock, at Aberdeen, in October 1834, . . . 447
XLI. Fourth Meeting of the British Association for the Advancement of Science, at Edinburgh, in September 1834, . . 454
XLII. Miscellaneous Notices,—

I. Roman Method of Colonization, 458.—II. Extent and Population of Great Britain and her Colonies, 461.—III. Historical Sketch of the Months of July, August, and September, ib.—IV. Historical Sketch of the Holydays in the Months of July, August, and September, 463.—V. Great Blast at Craigleith Quarry, ib.—VI. Extinction of Fires, 464.—VII. The Itch Insect, ib.—VIII. On the Plant which yields the Cascarilla Bark, 465.—IX. On Marl, 466.—X. Turkish Mode of Punishing Dishonest Bakers, 467.—XI. On the Choice of Linseed Oil, ib.—XII. On Spirits of Turpentine, ib.

Page
XLIII. Quarterly Agricultural Report, . . . . 468
XLIV. Foreign Corn Markets, . . . . . 474
XLV. Tables of the Prices of Grain, Butcher-Meat, and Wool; of the Monthly Reports of the Foreign Corn; of the Revenue, &c. . 476
XLVI. On the Application of Steam to purposes of Husbandry. No. II. . . . . . . . . . . 479
XLVII. On Water Meadows causing the Rot in Sheep, . 503
XLVIII. Remarks on Hedges, . . . . . 505
XLIX. On the Preservation of Potatoes over the year, . 513
L. On the supposed Coarse Quality of certain Grasses. By Mr Gorrie, Annat Garden, . . . . . . . 515
LI. On the Culture of the Hop. By Mr Towers, Author of the Domestic Gardener's Manual, . . . . . . 519
LII. Some Account of the Settlement of Fergus in Upper Canada, 529
LIII. On Allotting Muir-Lands to Crofters. By Mr William Blackadder, Glammis, . . . . . . . . 531
LIV. On the Diseases of the Larch in the South of Scotland. By Mr James Webster, Gardener to John Herries Maxwell, Esq. of Munches, . . . . . . . . . . . 535
LV. On the Rot in Larch. By Mr Gorrie, Annat Garden, . 537
LVI. On the Evils attending the various Systems in the Administration of the Poor Laws, and a Plan for their Amelioration. By the Rev. John Thomas Tryon, Rector of Bulwick, Northamptonshire, 545
LVII. Remarks on the Growth and Diseases of the Larch, . 574
LVIII. On the Birds of America, . . . . . 576
Ornithological Biography, or an Account of the Habits of the Birds of the United States of America. Vol. II. By John James Audubon, Esq. Adam and Charles Black, Edinburgh; Longman and Co. London.
LIX. On the Cultivation of Fruit, . . . . . 581
The Fruit Cultivator, being a practical and accurate description of all the most esteemed Species and Varieties of Fruit cultivated in the Gardens and Orchards of Britain, &c. By John Rogers, Nurseryman, formerly of the Royal Gardens. 1834. Small 8vo. 6s.
LX. Remarks on the Excretory Theory of Plants, . . 586
LXI. Remarks on the recent Failure of the Potato Crop, . 590
LXII. On the Local Distribution of different species of Trees in the native Forests of America, . . . . . . 594
LXIII. Account of some Experiments to ascertain the Effect of different Manures upon the Potato, . . . . . 608
LXIV. Some Account of the Mode of Fattening Calves in the neighbourhood of London. By Mr Main, Chelsea, . . 608
LXV. On judging Cattle by Measurement and Weight, . 612
To our Readers . . . . . . 617

Page

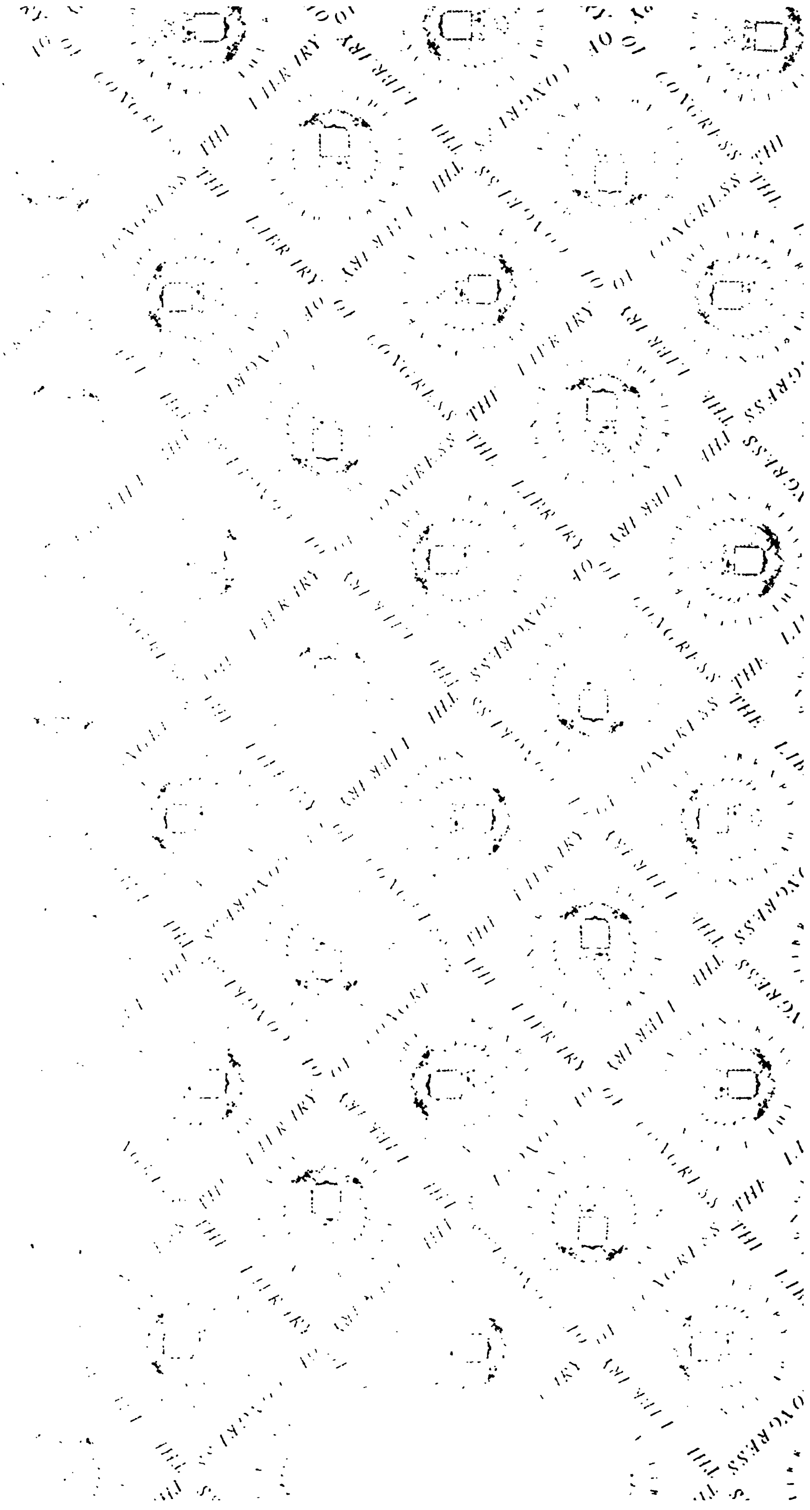
LXVI. Miscellaneous Notices, . . . . . . 618

I. The Lawton Hybrid, a new Turnip, 618.—II. The Annat Barley, a new variety of Barley, ib.—III. Importation of the Bones of Cetaceous Animals from the Polar Seas for the purposes of Manure, ib.—IV. Animalized Carbon, a new Manure, 619.—V. Historical Sketch of the Months of October, November, and December, 620.—VI. Historical Sketch of the Holidays in November and December, 621.—VII. Wheat Crops destroyed by Field Mice in France, 622.—VIII. Parmesan Cheese, ib.—IX. New Machine for Cleaning Hemp, 623.—X. Comparison of Men with Animals, 624.—XI. St Michael Oranges, 625.——XII. How to make a Quartern Loaf out of a Deal-board, 626.

LXVII. Quarterly Agricultural Report, . . . 627

LXVIII. Tables of the Revenue; the Prices of Grain, Butcher Meat, and Wool; of the Monthly Returns of Foreign Corn, &c. . 637

LXIX. Foreign Corn Markets, . . 640


THE LIBRARY OF CONGRESS

LIBRARY OF CONGRESS
00026913494